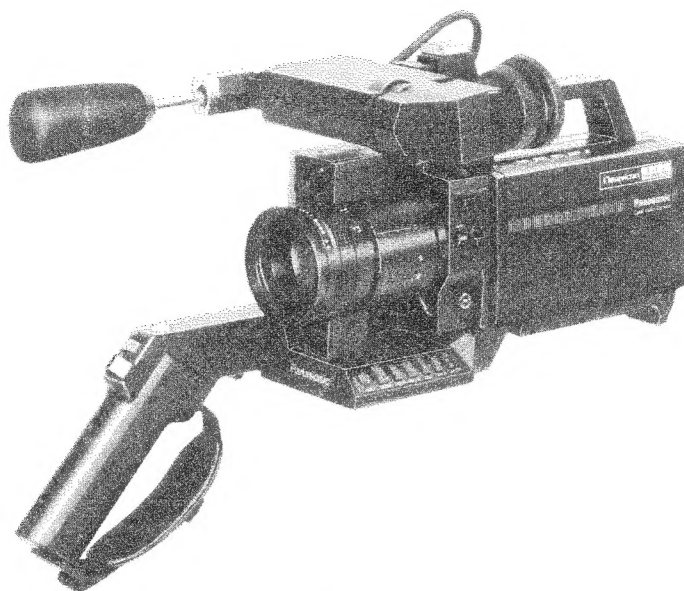


Service Manual

Color Video Camera

PK-958



PK-958

Vol. 1

Summary

Vol. 2

*Adjustment
Procedures*

Vol. 3

Block Diagrams

Vol. 4

*Schematic
Diagrams
Printed Circuit
Board Diagrams*

Vol. 5

*Exploded Views
Replacement
Parts List*

Panasonic®

Matsushita Engineering & Service Company
Division of Matsushita Electric
Corporation of America
50 Meadowland Parkway, Secaucus,
New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhū St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

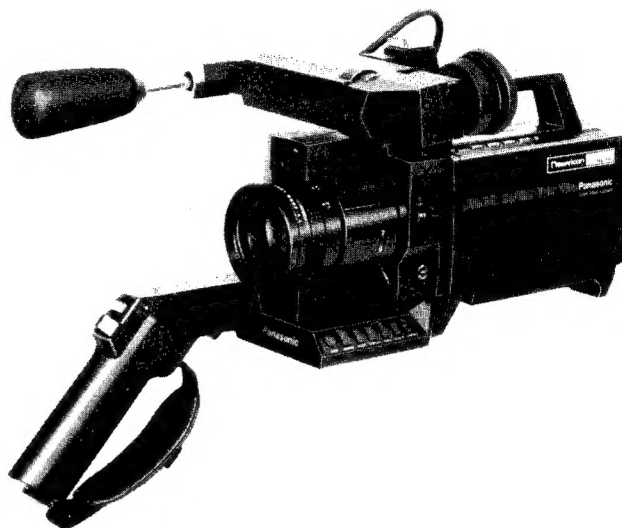
Service Manual

Color Video Camera

PK-958

Vol. 1

Summary



PK-958

SPECIFICATIONS

Power Source: DC 12V \pm 10%
AC 120V \pm 10%, 60Hz \pm 0.5%
(with Power Supply Unit)

Power Consumption: DC 6.6W at 12V DC (Battery)
(with E.V.F.) (6W with Auto Focus off)
DC 2.0W at standby

Newvicon Tube
System: 2/3" frequency separation single tube
system (built in stripe filter)

Single Carrier
Frequency: 5MHz

Focus System: Electro-static type

Lens Mounting: Built in zoom lens (not "C" mount)

Lens: 8:1 zoom lens with auto/manual iris
control
Power zoom lens (2 speed) and macro
construction
F: 1.4, f: 11mm ~ 88mm
d: 1.0m to infinity

Lens Diameter: 58mm

Light Sensitivity: Minimum light intensity on optical
image: 7 lux (F: 1.4)
Optimum light intensity on optical
image: 900 lux

Video Output Level: 1.0Vp-p, 75 Ω (Standard NTSC signal)

Sync. System: Internal Sync.: RS-170

Signal to Noise Ratio: More than 45dB

Horizontal Resolution: 300 lines

Color Temperature
Control: 2 step switch (indoor/outdoor) &
Auto adjust

Microphone: Stereo microphone

Audio Output Level: -20dB, Hi-impedance

Audio Output
Impedance: High impedance (1K Ω)

External Microphone
Input Impedance: 600 Ω unbalanced
(Left, Right)

Electronic Viewfinder: Monochrome 1 inch CRT

Operating
Temperature: 5°C to 40°C

Operating Humidity: 10% to 75%

Operating Position: Normal position and Gain up position

Weight: Camera Head with E.V.F.
5.5 lbs (with lens, 7 ft cable & shoulder
pad/handle grip)
AC adaptor (option)
2.4 lbs

Dimensions: Camera Head with E.V.F.
8.4"(W) \times 7.7"(H) \times 16.4"(D)
210mm(W) \times 192mm(H) \times 409mm(D)
AC adaptor (option)
3"(W) \times 3"(H) \times 6"(D)
79mm(W) \times 75mm(H) \times 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

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GENERAL SAFETY PRECAUTIONS

PRODUCT COMPLIES WITH DHHS PULES 21CFR SUBCHARTER
J APPLICABLE AT DATE OF MANUFACTURE
SAFETY PRECAUTION

GENERAL GUIDELINES

1. When service is required, observe the original lead dress. Components, wires or cables that indicate evidence of overheating or other electrical or mechanical damage should be replaced.
2. After servicing the camera, power supply and electronic viewfinder, all the protective devices, such as insulation tape, shields and isolation R-C combinations must be properly installed.
3. Potentials as high as 5KV are present when the electronic viewfinder is operating. Operation without the camera head side covers, finder case ass'ys of electronic viewfinder and covers of power supply unit presents a danger of shock hazard from the camera power supply.
Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions that should be taken when working on high-voltage equipment. Always discharge the anode of the picture tube to the main chassis before handling the tube.
4. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

Conduct this test on the power supply unit with the camera disconnected and repeat with the camera power supply unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Turn the AC switch on.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed terminal, screwheads and coaxial connector.
The resistance measured should not be less than ∞ (infinity).
Any resistance value below this range indicates an abnormality which requires corrective action.
3. Repeat the test with the AC switch in the "off" position.

LEAKAGE CURRENT HOT CHECK

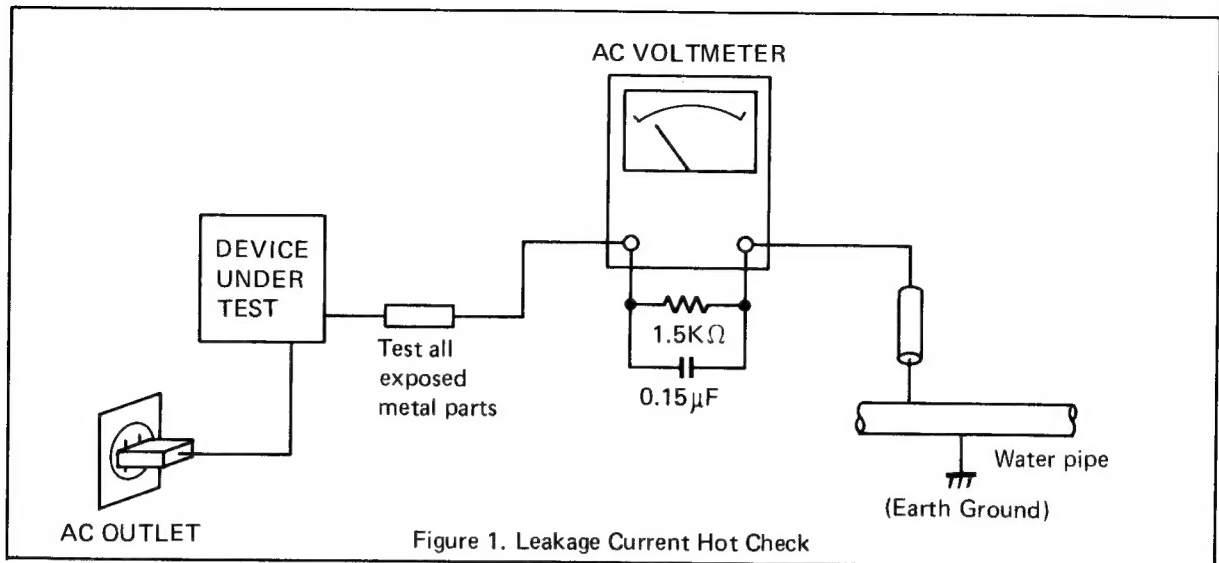
Conduct this test on the power supply unit with the camera disconnected and repeat with the camera, power supply unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a $1.5K\Omega$ 10 watt resistor, paralleled by $0.15\mu F$ capacitor, between each exposed metallic part on the unit and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with $1000\Omega/\text{volt}$ or more sensitivity, to measure the potential across the resistor.
4. Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet, Screwheads, Metallic overlays, etc), and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 V RMS.

A leakage current tester (FLUKE MODEL: 8000A equivalent) may be used to make the hot checks.

Leakage current must not exceed 0.5 milliamp.

In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.



X—RADIATION

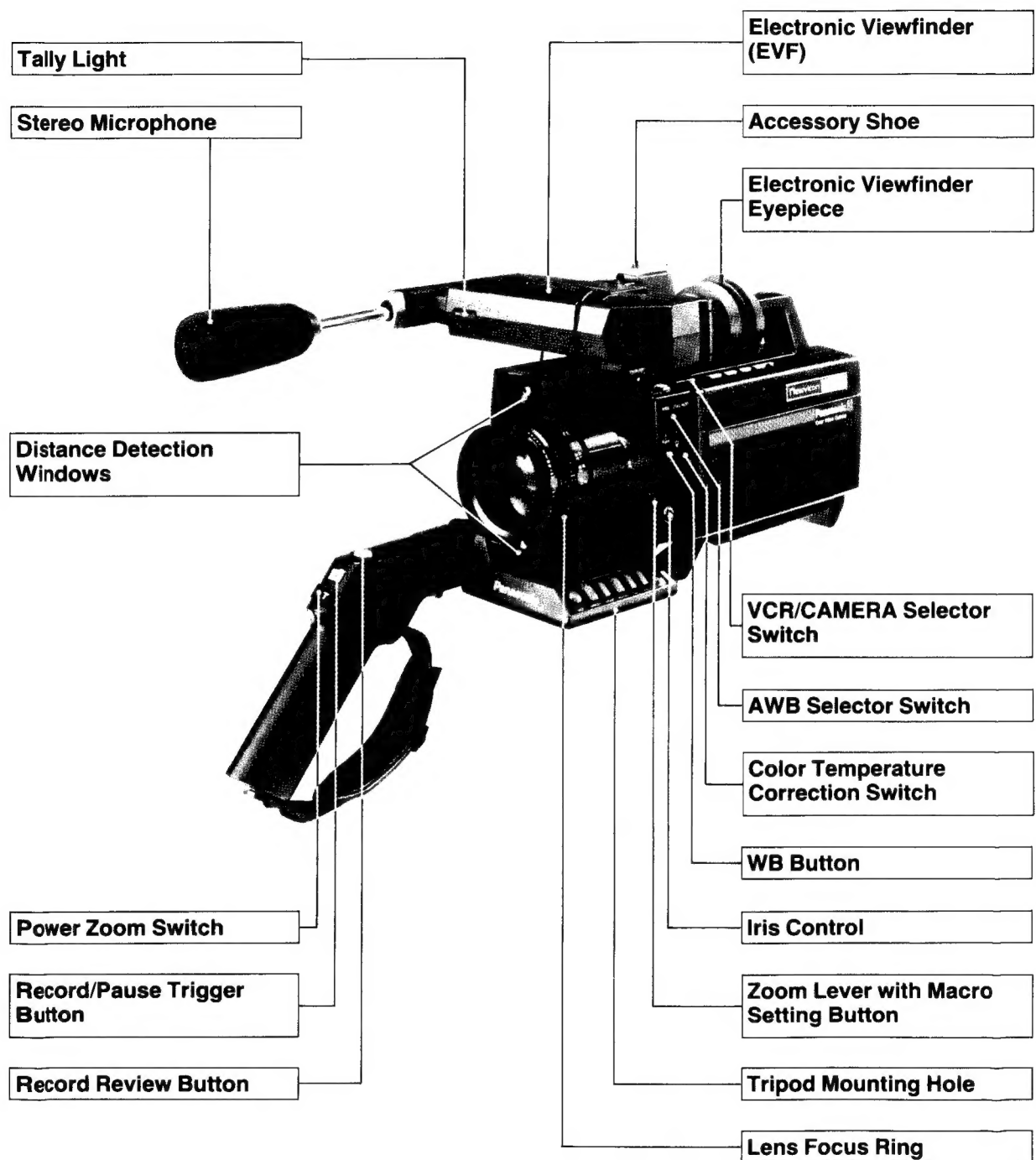
1. The potential source of x-radiation in electronic viewfinder is the high-voltage section and picture tube.
2. It is important to use a periodically checked and accurate high-voltage meter, to monitor and check the high voltage.
Rotate the brightness control and contrast fully counterclockwise for this test.
3. Observe that the high voltage does not exceed the specified value.
Excessive high voltage may cause a possible x-radiation hazard.
The camera system should be repaired as soon as possible.
4. It is essential to use the specified picture tube to avoid a possible x-radiation hazard.

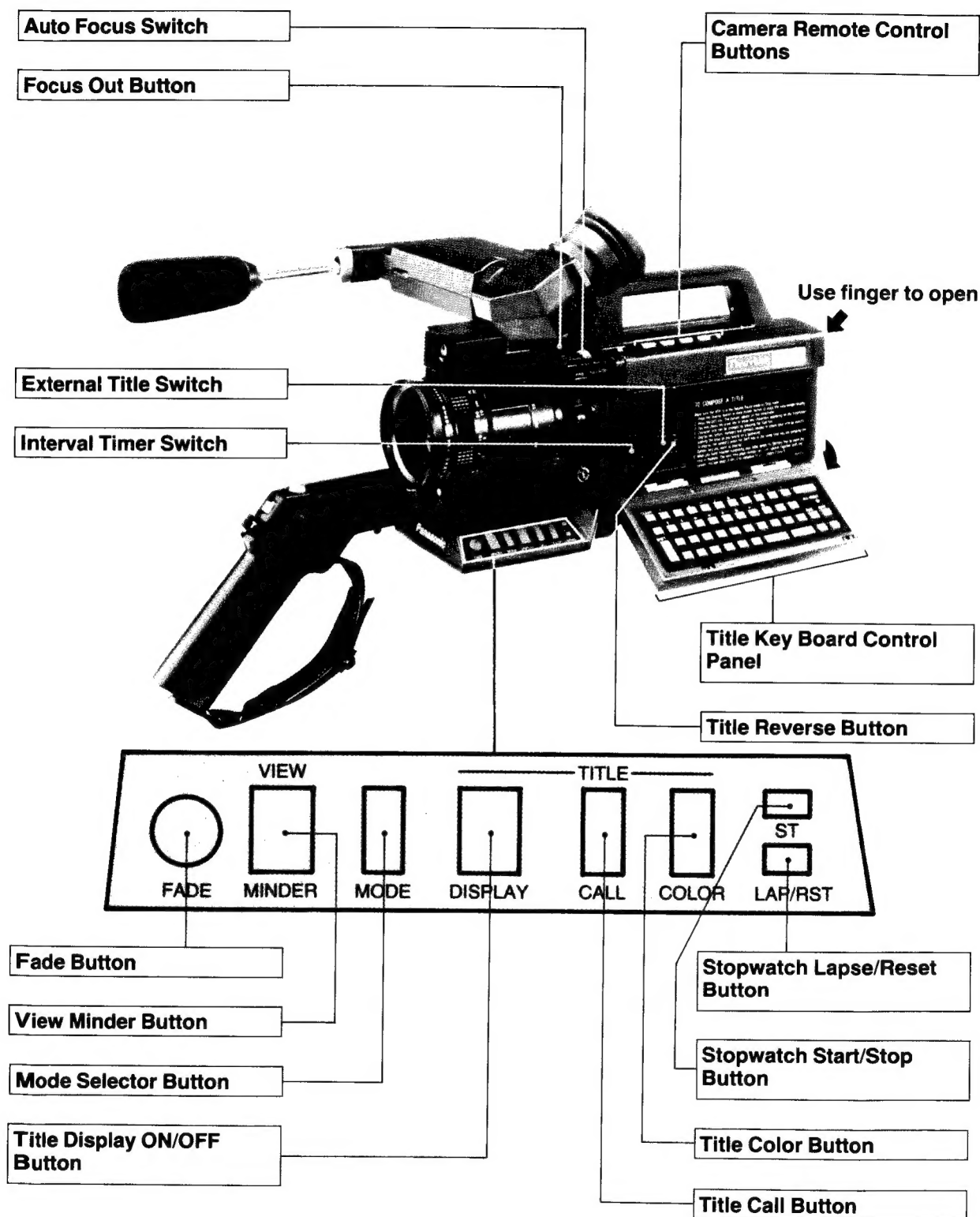
ELECTROSTATICALLY SENSITIVE (ES) DEVICES

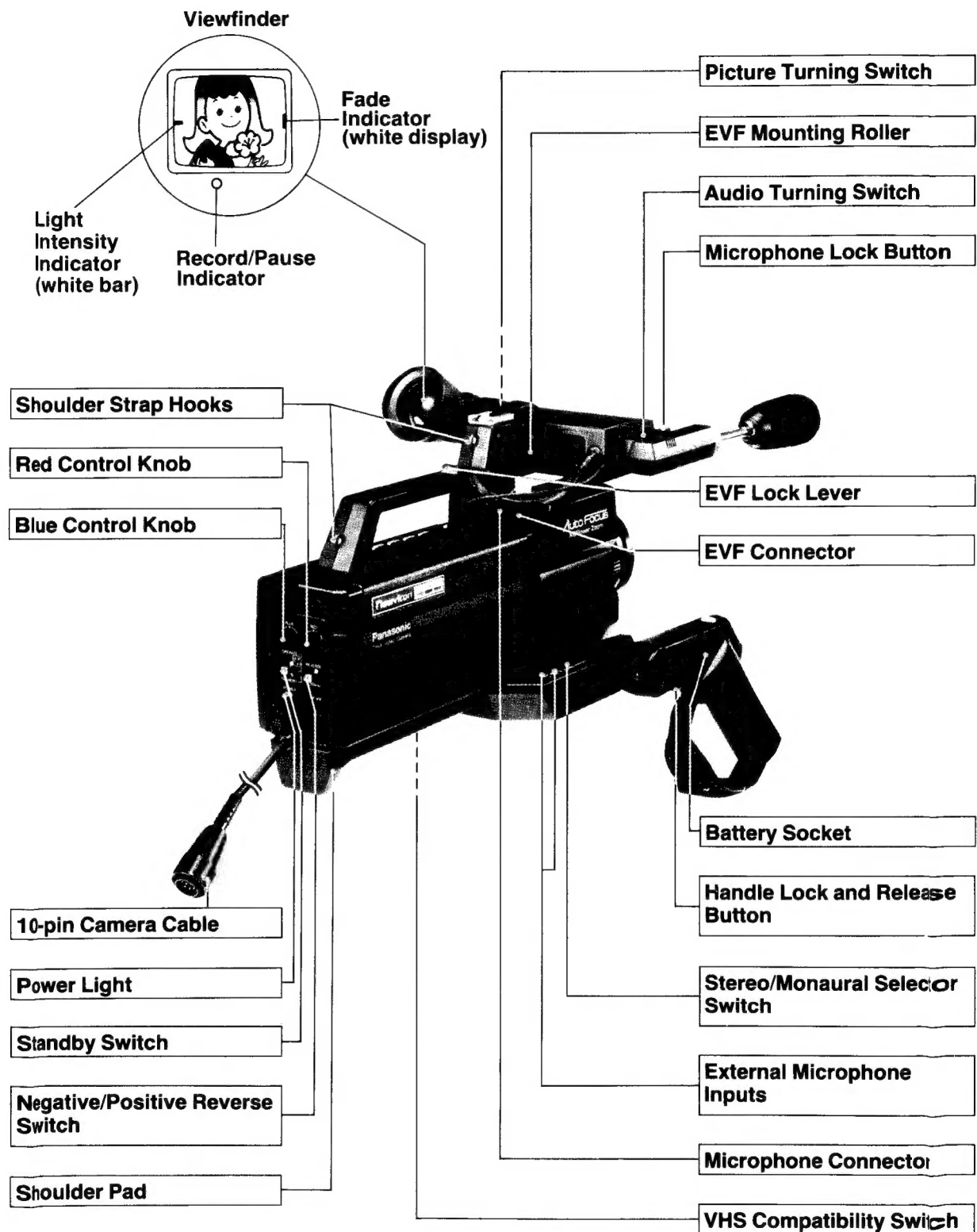
Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

CAMERA FEATURES AND CONTROLS







CONNECTION DIAGRAM WITH VCR

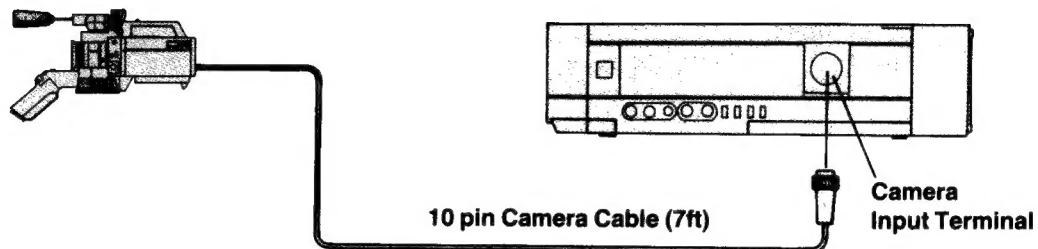
The camera must be connected to a VCR and/or power source because the camera does not have a power source of its own.

Connect the camera as shown.

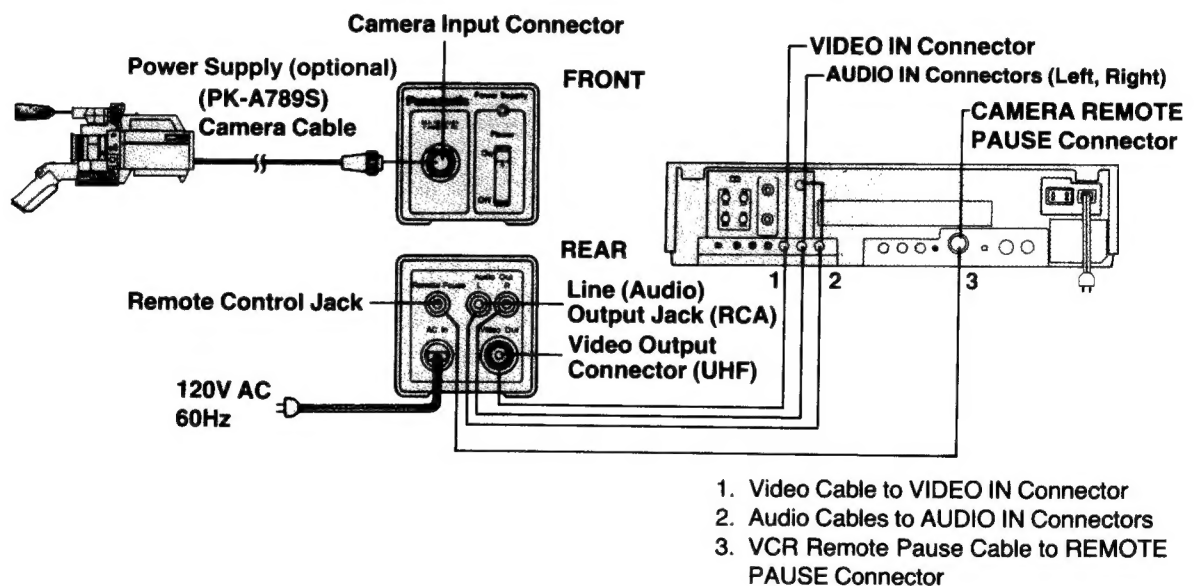
Note all power should be off when making cable connections.

Connecting cables with power on can damage the units.

A: Camera Head and Portable VCR or VCR with 10-pin connector



B: Camera Head, optional power supply and VCR without 10-pin connector

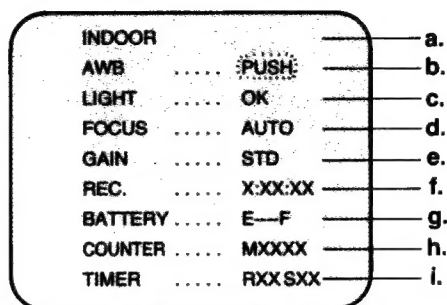


- Note:**
- The camera cable between camera head and power supply or between camera head and portable VCR can be extended by using the optional extension camera cables. (Use three 20 feet extension cables to extend upto 67 feet)
 - The connections between the VCR and TV set are explained in the operating instructions for the VCR.

VIEW MINDER DISPLAY

View minder display (Camera check display)

The camera's setting conditions can be displayed on the viewfinder by pressing the View minder button when the VCR is in the Record/Pause mode. When the View minder button is pressed again, the display disappears. This View minder display will disappear during recording and will not be recorded.



The meanings of these indications are

- a. INDOOR : The color temperature switch is set to position.
OUTDOOR : The color temperature switch is set to position.
- b. AWB **PUSH** : Push the WB button to adjust the white balance. "PUSH" flashes.
AWB **OK** : White balance has been adjusted.
AWB **RED** : The picture appears reddish. "RED" flashes.
AWB **BLUE** : The picture appears blueish. "BLUE" flashes.
- c. LIGHT **OK** : The illumination is proper.
LIGHT **LOW** : The illumination is insufficient. "LOW" flashes.
- d. FOCUS **AUTO** : Automatic focusing.
FOCUS **MANUAL** : Manual focusing.
- e. GAIN **STD** : The Standby switch is in the STANDARD (STD) position
GAIN **UP** : The Standby switch is in the GAIN-UP position.
- f. REC X:XX:XX : Accumulated recording time (X hour XX min. XX sec.).
Maximum time: 9 hours, 59 minutes and 59 seconds.
This will be reset when the power is off.
- g. BATTERY ... E ---- F : This display indicates that the battery in the portable VCR is fully charged.

E --- F :
E -- F :
The hyphens will disappear as the battery charge is used.

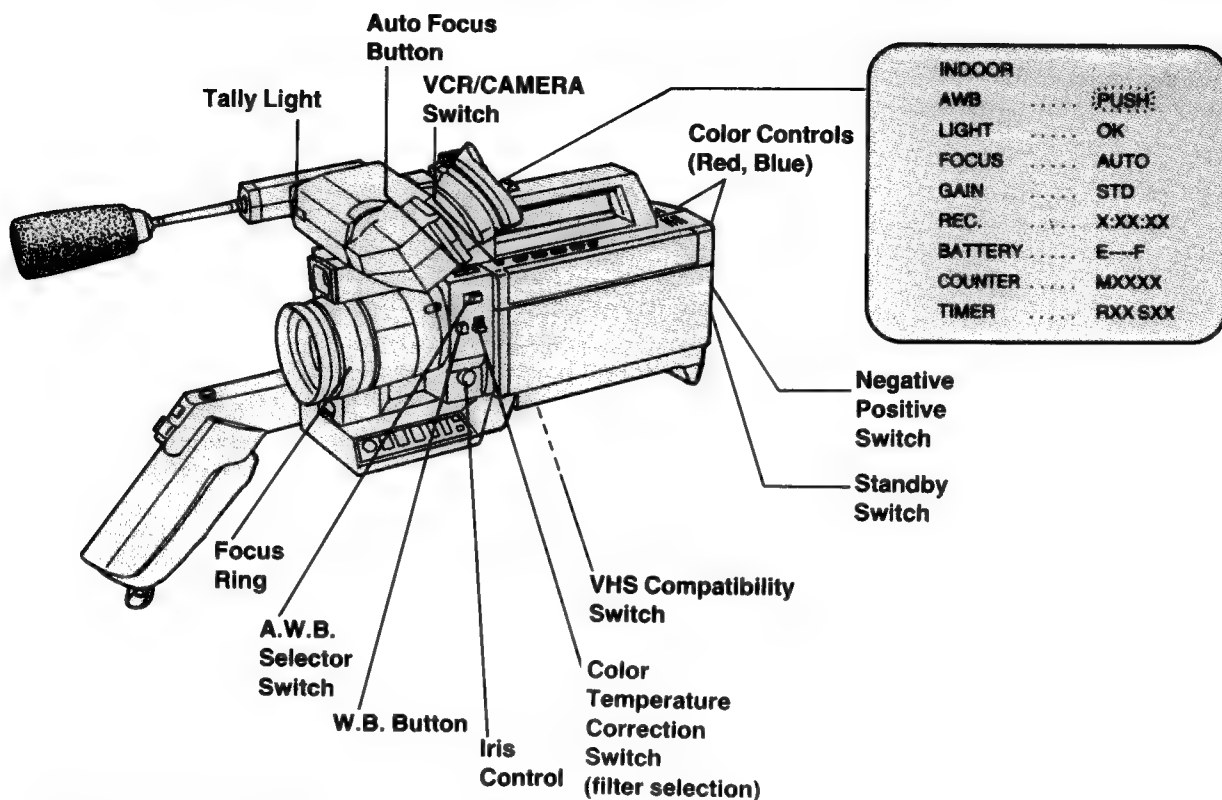
E F : The last hyphen flashes just before the VCR turns itself off. The battery must be re-charged before further use is possible.

- h. COUNTER MXXXX : Tape counter and its memory will be indicated in conjunction with the display counter of the portable VCR.
- i. TIMER RXXSXX : Interval timer recording
Recording time XX min. Standby time XX min.

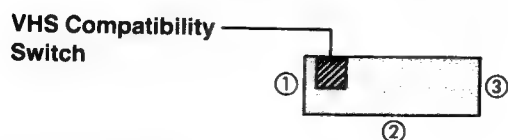
Note: • On some portable VCRs, VCR information (battery indicator, tape counter and its memory) will not be displayed.

- Interval timer recording is not available when the camera is connected with a table type VCR.

PREPARING TO RECORD (BASIC OPERATION)



1. Connect the camera and VCR as shown on page 10.
2. Turn on the VCR power and the camera power supply (if used).
Note: On some VCR models, you may have to switch the input selector to the CAMERA position.
3. If the VCR has camera remote feature, set the camera remote switch to the ON position.
4. Set the VCR/CAMERA switch to the CAMERA position.
5. Set the standby switch to the OPERATE position.
The View minder display appears on the viewfinder.
6. The camera should be in the Record/Pause mode.
REC, PLAY and PAUSE buttons are lit on the VCR (or such indication in VCR display window).
If Record/Pause mode is not indicated at the VCR, put the VCR in Record/Pause. (See VCR Operating Instructions for Camera Recording).
7. The VHS compatibility switch is set to "1" position when the camera is shipped from the factory.
Make sure the Record/Pause indicator on the viewfinder is not lit and that the VCR is not recording.
If the Record/Pause indicator is off and the VCR is recording, set the VHS compatibility switch to the "2" or "3" position.
You will have to slide the shoulder pad back to gain access to this switch.

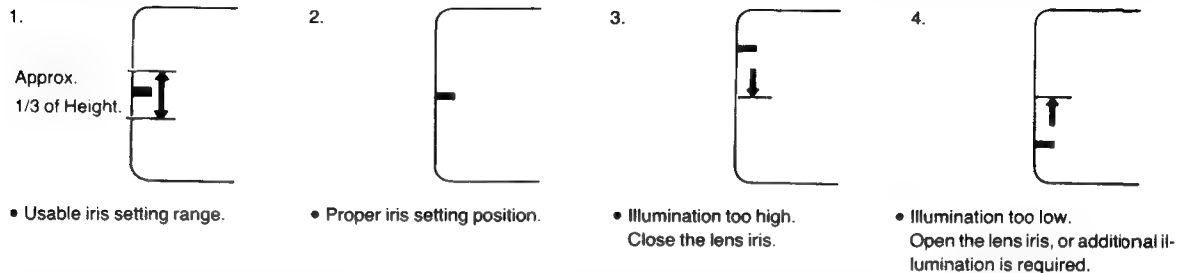


8. Remove the lens cap.
9. Set the color temperature correction switch.

☀for outdoor use.
💡for indoor use.

PREPARING TO RECORD (CONTINUED)

10. Make sure the light intensity indicator (the white bar on the left side of the viewfinder) is in the proper position and that the View minder display indicates "LIGHT OK". If the "LIGHT LOW" is displayed, additional illumination is required.



- When the iris control is pushed in, the auto-iris automatically adjusts the lens opening to admit the proper amount of light. When the iris control is pulled out, the lens iris can be manually adjusted by turning it.
- If you need to shoot in low light conditions, set the standby switch to GAIN-UP to make the picture brighter.

11. White balance adjustment

When the camera is first turned on, permit warm up for approximately 30 seconds before adjusting white balance. Make sure the color controls (Red, Blue) are in the detent position.

For simplified adjustment

Set the A.W.B. selector switch to FULL AUTO position. "AWB.....OK" appears on the View minder display.

For accurate adjustment

- Set the A.W.B. selector switch to PUSH position. "AWB.....PUSH" appears on the View minder display.
- Aim the camera at a white object or background (never at a light source).
- Push the W.B. button in and hold for 2 to 3 seconds until the "AWB.....OK" appears on the View minder display. This indicates the white balance has been automatically set.

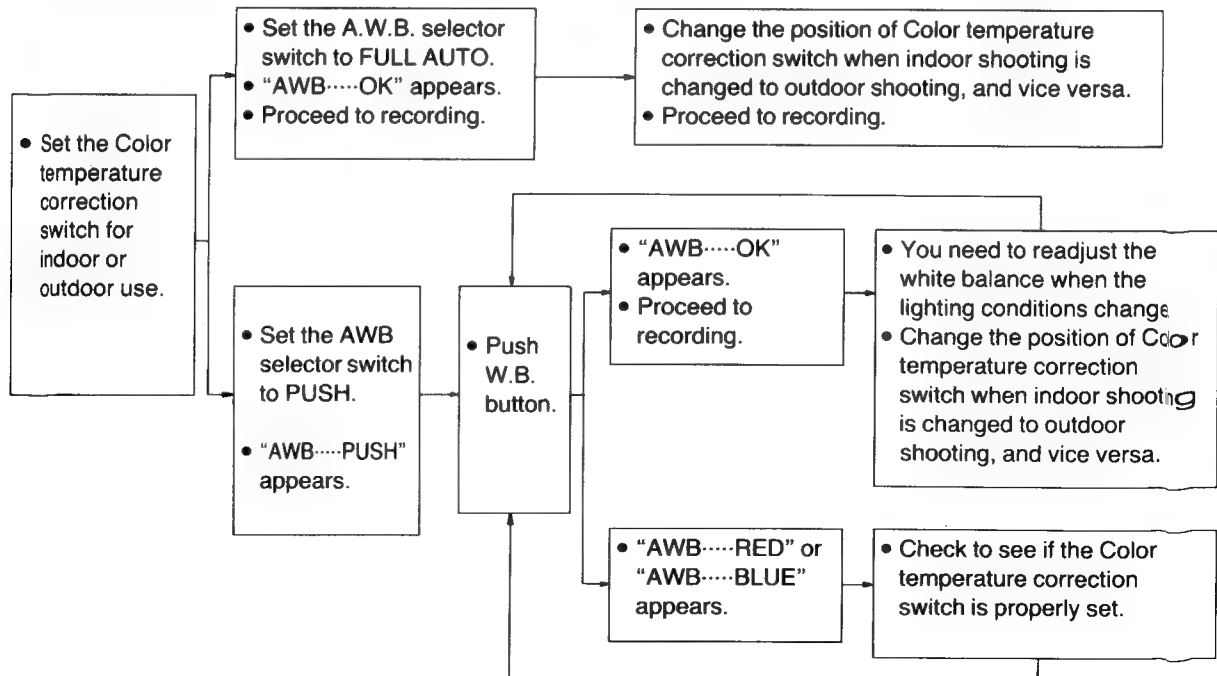
Note: • Make sure "LIGHT.....OK" appears on the View minder display.

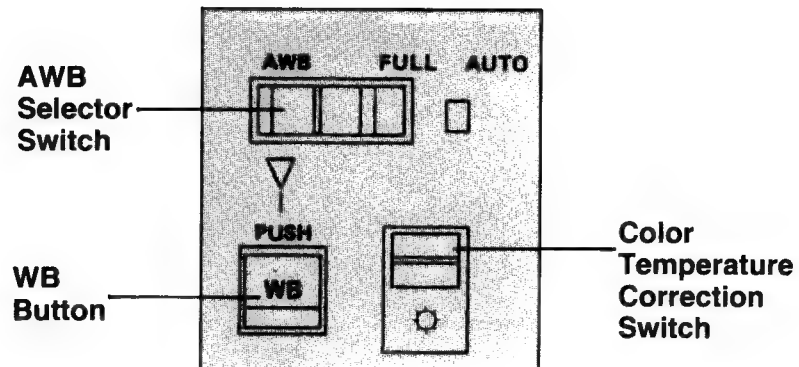
If "LIGHT.....LOW" appears, automatic white balance control function will not operate.

- The White balance is held in memory for about 2 hours even when the camera power is switched off.

When power is switched on again within this time, "AWB.....OK" appears on the View minder display.

- If the "AWBRED" or "AWB.....BLUE" is displayed the picture appears reddish or blueish and optimal white balance is not possible. This will be caused by a wrong position of color temperature correction switch.
- You need to push the W.B. button every time the lighting conditions change.





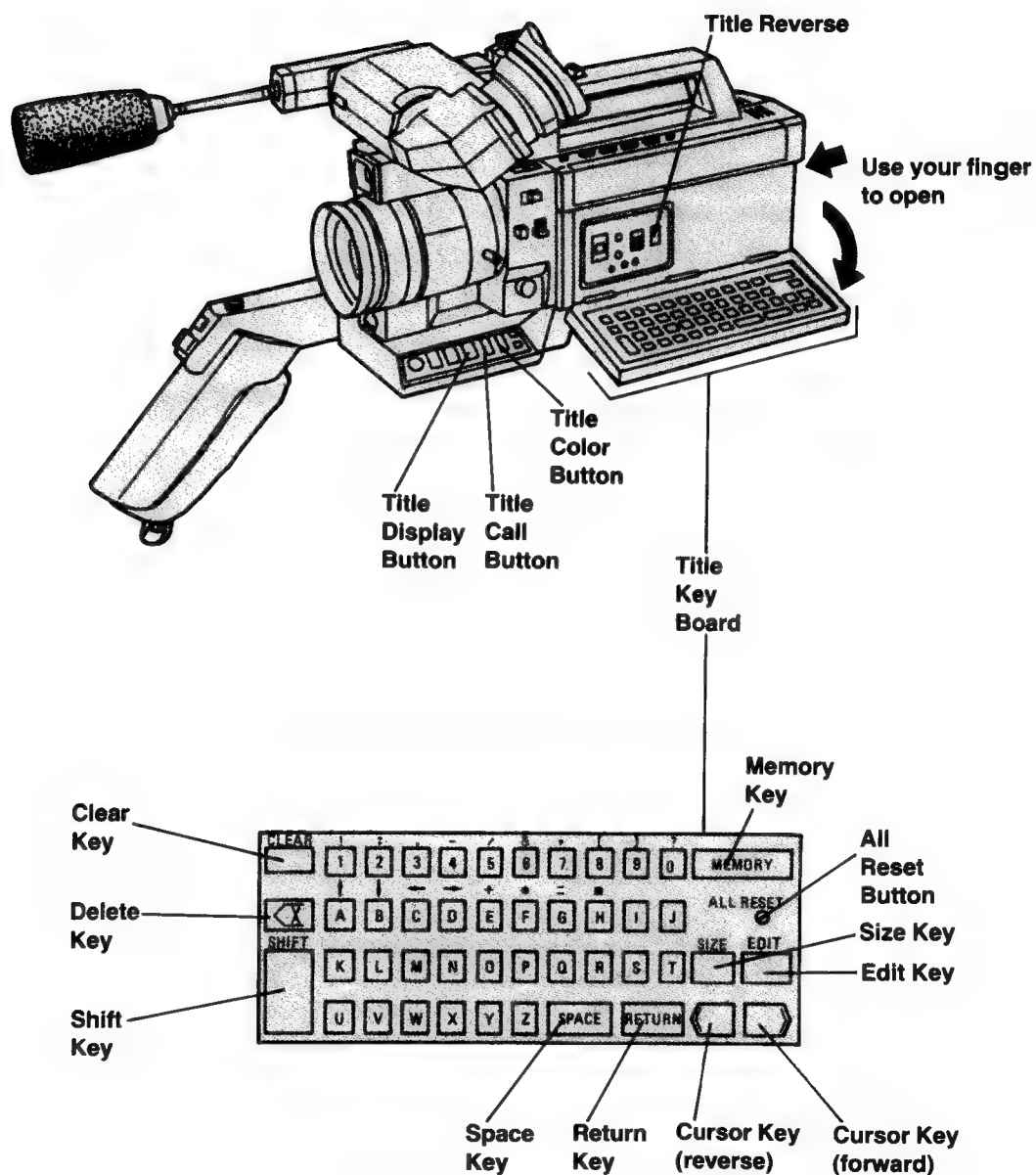
12. If you are shooting indoors and have a color TV hooked up as a monitor, you can adjust the color balance using the color controls (Red, Blue). Set the A.W.B. Selector switch to PUSH position. You can also use these controls for special effects. For example: make a sunset more spectacular by increasing the red balance.

TITLE DISPLAY (INTERNAL TITLE)

You can compose your own titles and insert the titles onto a recording.

The title keyboard is located inside the left side cover.

The keyboard contains 26 alphabet keys, 10 number keys, 18 types of symbols and several control keys.



TITLE DISPLAY (CONTINUED)

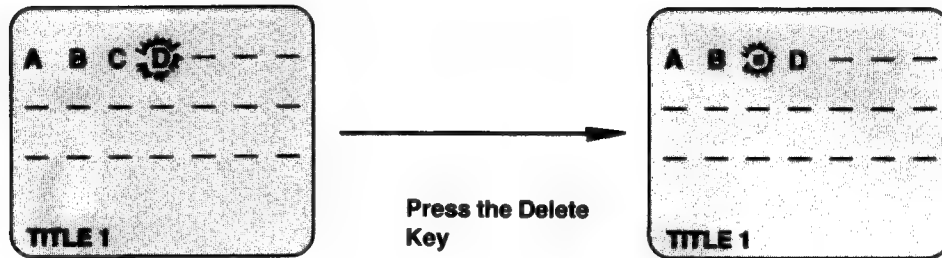
Useful Control Keys for Composing Titles

① Cursor Key

Allows you to move the flashing cursor to a desired location. There are two keys for forward and reverse directions. When you press the Shift key and Cursor key simultaneously you can move the title to a right or left direction.

② Delete Key

Allows you to erase unwanted characters. When you press the Delete key you will delete the character on the left of the flashing cursor or flashing letter.

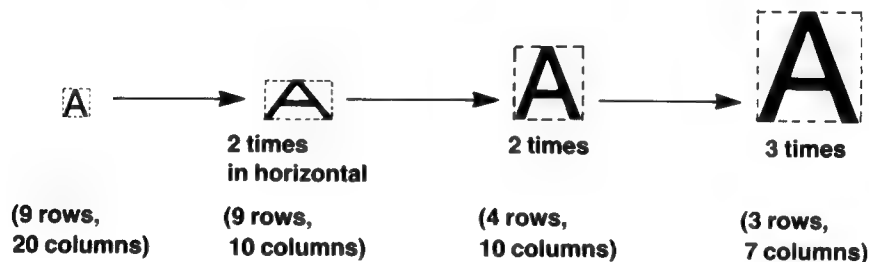


③ Return Key

Just like a typewriter this key allows you to return to the left, on the next line. When pressed at the end of the bottom line it moves the flashing cursor to the upper left corner.

④ Size Key

Four different character sizes can be obtained by pressing the Size key once for each size.



⑤ Shift Key

This key allows you to use the 18 types of symbols and also to shift the title's position.

⑥ Space Key

When pressed creates a space between words when needed.

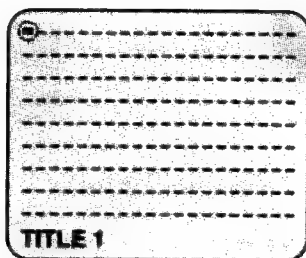
⑦ Clear Key

Pressing the Clear key clears the title and moves the flashing cursor to the upper left corner.

To compose a title

Make sure the VCR is in the Record/Pause mode or Stop mode.

1. Press the Title Display button or View minder button to erase the View minder display.
2. Press the Edit key on the keyboard so that the cursors appear on the viewfinder.

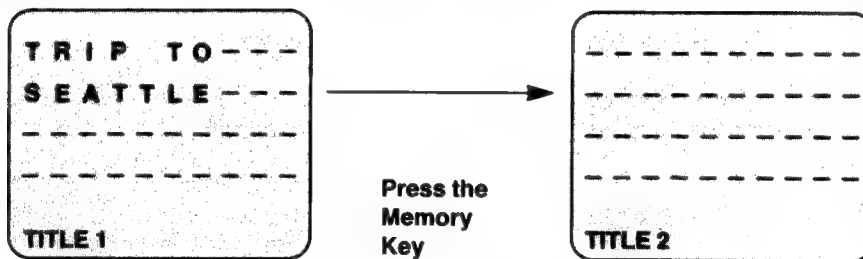


The cursor on the upper left corner of the monitor flashes and title page number appears on the lower left corner. The flashing cursor indicates the location at which the character is to be displayed.

3. You may press the Clear key to erase any characters appearing on the Viewfinder.
4. Character size can be changed by pressing the Size key.
5. Display the letters, numbers and symbols needed to create your title by directly pushing the keys as you would on a typewriter.

To display the symbols press the Shift key at the same time you are pressing the symbol key you want to display. Once characters are displayed, a character flashes at the position where it can be changed by pressing the key.

6. When you have finished composing your title, press the Memory key to store the title in memory. The next title page number will then appear together with the cursors. Follow steps 3 thru 5 to compose titles in pages 2 thru 8.

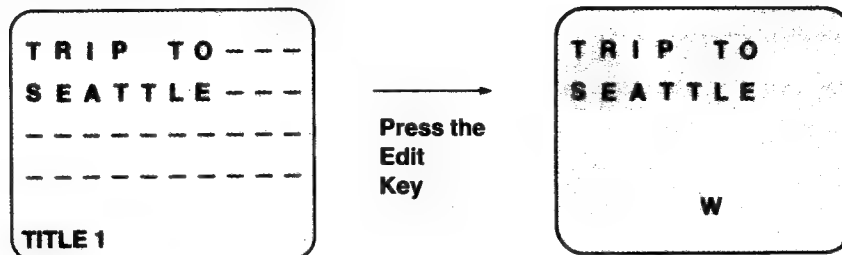


- Note:**
- The battery must be inserted in the camera for the titles to be saved.
 - The ALL RESET button is used to clear all titles from the memory. This button is recessed and can be pressed with a pencil point, etc.
Be sure to push the ALL RESET button when you compose the title for the first time or after you replace the battery, otherwise random characters may appear on the monitor.
 - Make sure fresh battery is installed so that the title memories are retained when the camera power is turned off. When the battery level is low, all titles retained in the memory will be cleared.
The battery life is around 1 year.
Battery level can be checked using the View minder display (See page 13).

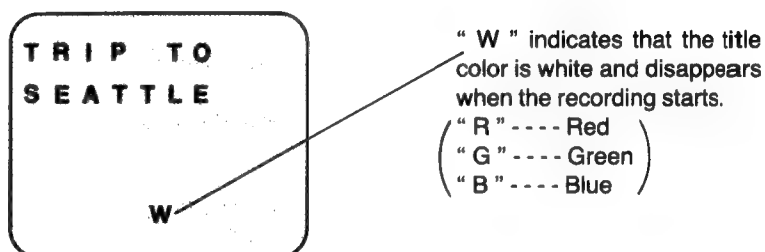
TITLE DISPLAY (CONTINUED)

To record a title you have composed

1. Press the Edit key a second time. Title page number and cursors disappear on the monitor.



2. Press the Title Call button until desired title appears on the monitor.
3. Select the title color by pushing the Title Color button.
4 colors (White, Red, Green, Blue) are selectable.
Title color display appears on the monitor together with title display.

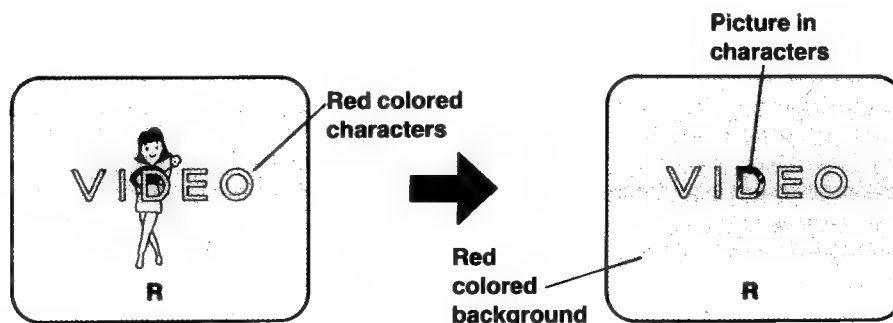


4. Press the Record/Pause button on the handgrip to start or stop the recording.
5. Title Display button is used to turn the title display on and off.
Press the Title Display button when you want to remove title display from picture.

Title reverse

After composing the title, you can use the title reverse feature.

By pressing the Title Reverse button in the Record/Pause mode, the color titles and background are reversed as below.
Select the color with the Title Color button.



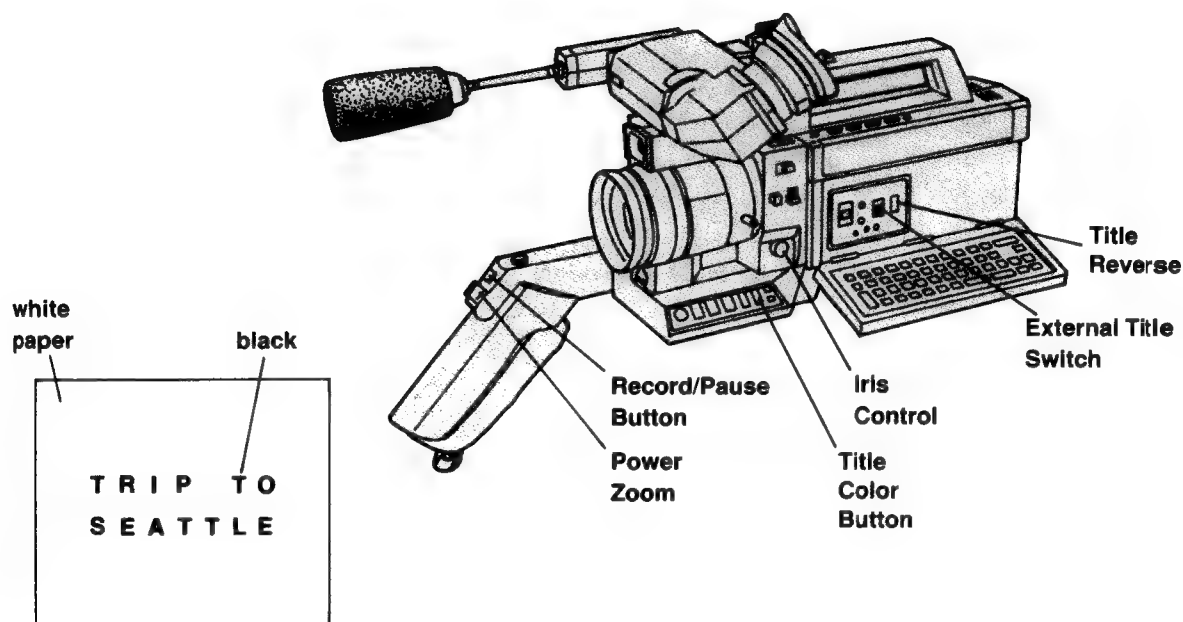
Note: When the title display color is white, this function will not be available and grey background appears by pressing the Title reverse button, and white title portion remains white.

EXTERNAL TITLE DISPLAY

Your own title can be recorded by using the external title feature.

How to make external title

Draw graphics or write title as large as possible on the white paper/panel.



The graphics or title should be black for best results.

How to record external title

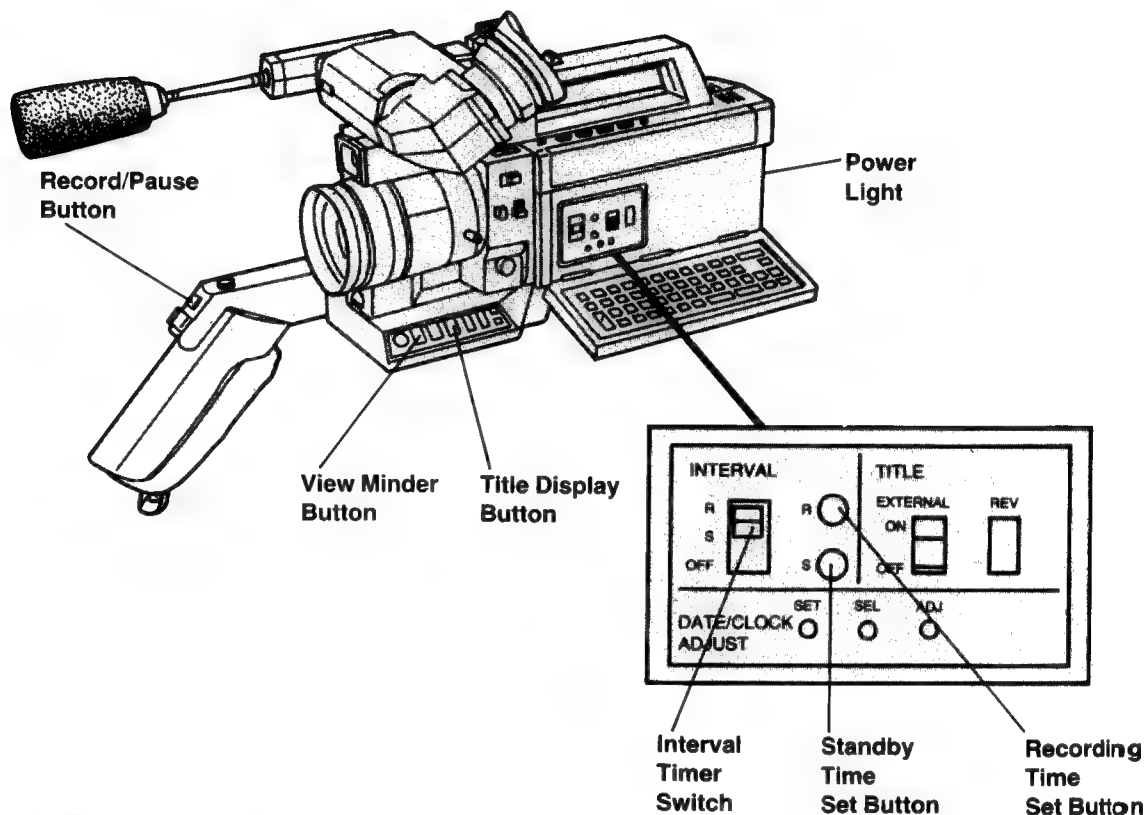
Make sure that the VCR is in the Record/Pause mode.

1. Aim the camera at the external title.
2. Set the screen/title size by using zoom and focus the title.
3. Set the External title switch to the ON position.
4. Select the title color by pushing the Title Color button.
5. When the title letters are not clear, pull the iris control out and adjust the iris manually. Additional illumination may be required.
6. You may use the Title reverse and Negative/Positive reverse features.
7. Press the Record/Pause button to start or stop the recording.

Note: • The date, time and stopwatch can be recorded with the external title.
• When the external title is displayed, the internal title function will not operate.

TIME LAPSE RECORDING

The Interval Timer allows you to do time lapse recording. This type of recording enables you to do short recordings over a long period of time automatically. Time lapse recording is not available when the camera is connected with a table type VCR.



To set the Time lapse recording.

1. Press the View minder button to display the View minder display. Make sure that the VCR is in the Record/Pause mode.
2. Set the Interval timer switch to the "R" position so that "TIMER --- RXXSXX" appears on the View minder display and time lapse recording (recording → standby → recording →) is possible.

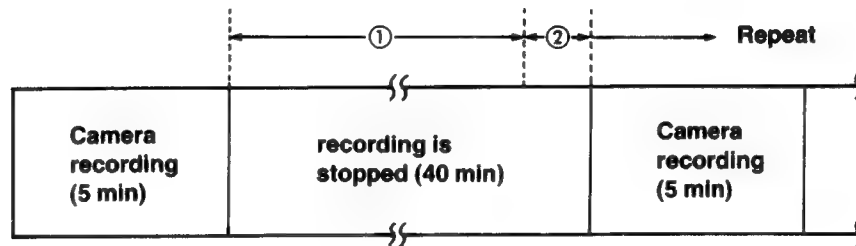
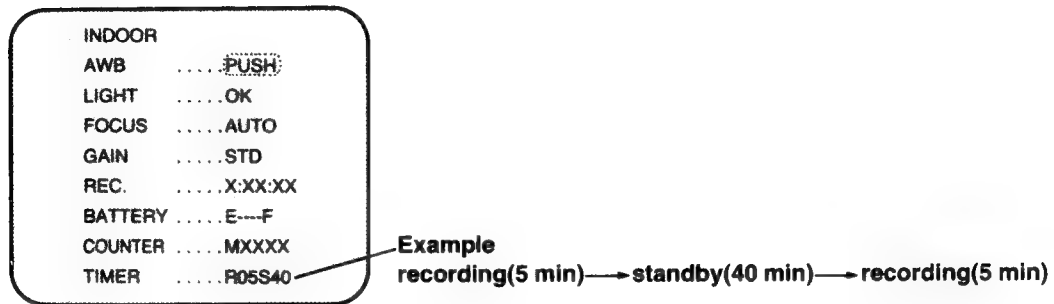
INDOOR	
AWB	... PUSH
LIGHT	... OK
FOCUS	... AUTO
GAIN	... STD
REC.	... X:XX:XX
BATTERY	... E---F
COUNTER	... MXXXX
TIMER	... RXXSXX

Interval timer display.

When the switch is set to the "S" position, "TIMER --- SXXRXX" appears and reverse operation (standby → recording → standby →) is possible.

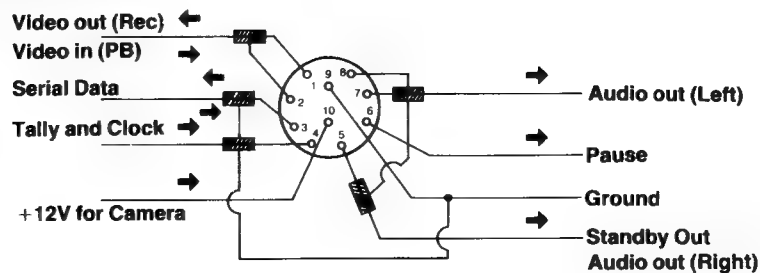
When the switch is set to OFF position, no timer display appears and time lapse recording is not possible.

- Press the Set buttons with a pencil point to adjust the recording and standby time while watching the View minder display on the viewfinder. Maximum time for recording and standby is 59 minutes. Minimum time for recording and standby is 1 minute.



- The power light flashes in green during standby time of VCR and glows red when picture appears on the viewfinder or monitor.
- Picture appears 1 minute before recording resumes and power light turns red.
- Press the Title Display button to remove the View minder display and display the title you want to record. You can also display date, time and stopwatch.
- Press the Record/Pause button to start the timer.
- To discontinue the timer operation, place the Interval timer switch in the OFF position and press the Record/Pause button to stop the recording.

10 Pin Camera Connector Diagram



Panasonic[®]
MATSUSHITA ELECTRIC

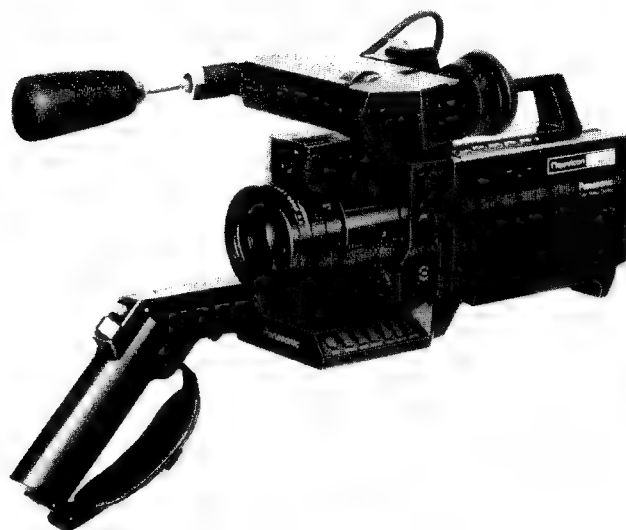
Service Manual

Color Video Camera

PK-958

Vol. 2

Adjustment Procedures



PK-958

SPECIFICATIONS

Power Source: DC 12V \pm 10%
AC 120V \pm 10%, 60Hz \pm 0.5%
(with Power Supply Unit)

Power Consumption: DC 6.6W at 12V DC (Battery)
(with E.V.F.) (6W with Auto Focus off)
DC 2.0W at standby

Newvicon Tube
System: 2/3" frequency separation single tube
system (built in stripe filter)

Single Carrier
Frequency: 5MHz

Focus System: Electro-static type

Lens Mounting: Built in zoom lens (not "C" mount)

Lens: 8:1 zoom lens with auto/manual iris
control
Power zoom lens (2 speed) and macro
construction
F: 1.4, f: 11 mm ~ 88 mm
d: 1.0m to infinity

Lens Diameter: 58mm

Light Sensitivity: Minimum light intensity on optical
image: 7 lux (F: 1.4)
Optimum light intensity on optical
image: 900 lux

Video Output Level: 1.0Vp-p, 75 Ω (Standard NTSC signal)

Sync. System: Internal Sync.: RS-170

Signal to Noise Ratio: More than 45dB

Horizontal Resolution: 300 lines

Color Temperature

Control: 2 step switch (indoor/outdoor) &
Auto adjust

Microphone: Stereo microphone

Audio Output Level: -20dB, Hi-impedance

Audio Output

Impedance: High impedance (1K Ω)

External Microphone

Input Impedance: 600 Ω unbalanced

(Left, Right)

Electronic Viewfinder: Monochrome 1 inch CRT

Operating

Temperature: 5°C to 40°C

Operating Humidity: 10% to 75%

Operating Position: Nomal position and Gain up position

Weight: Camera Head with E.V.F.
5.5 lbs (with lens, 7 ft cable & shoulder
pad/handle grip)
AC adaptor (option)
2.4 lbs

Dimensions:

Camera Head with E.V.F.
8.4"(W) \times 7.7"(H) \times 16.4"(D)
210mm(W) \times 192mm(H) \times 409mm(D)
AC adaptor (option)
3"(W) \times 3"(H) \times 6"(D)
79mm(W) \times 75mm(H) \times 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

Panasonic Company
Division of Matsushita Electric
Corporation of America
One Panasonic Way, Secaucus,
New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhū St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Panasonic Canada
Division of Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infantería, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

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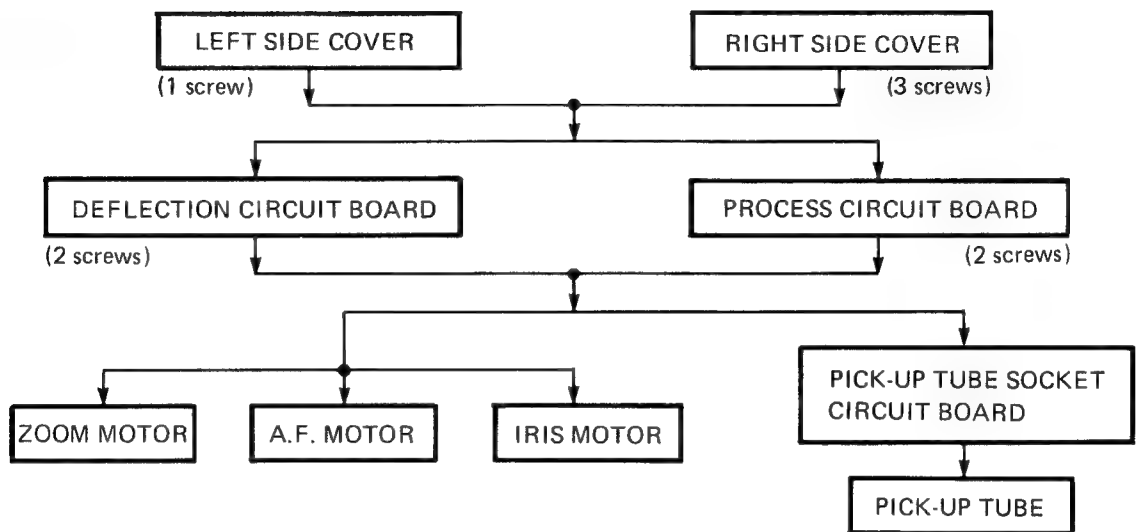
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ADJUSTMENT PROCEDURES

Disassembly Method

Caution: Camera Service must be performed in a dust free location to maintain clean lens elements.

1. DISASSEMBLY FLOW CHART



2. DETAILED DISASSEMBLY METHOD

2-1. Removal of E.V.F unit.

Turn the E.V.F knob, then, pull out the E.V.F cord and remove the E.V.F unit.

Note: "Left side (Process C.B.A)" and "Right side (Deflection C.B.A)" designations refer to the left and right sides of camera when viewed from the front (lens end).

2-2. Removal of Left Side Cover

- Unscrew 2 screws (rear side) and move the left side cover to the rear.
- Then, remove the left side cover.

2-3. Removal of Right Side Cover

- Move the shoulder slide to the rear.
Then, press the (A) portion and move the shoulder slide to the rear as shown in Fig. 1-A, Unscrew 2 screws (B). (See Fig. 1-B)

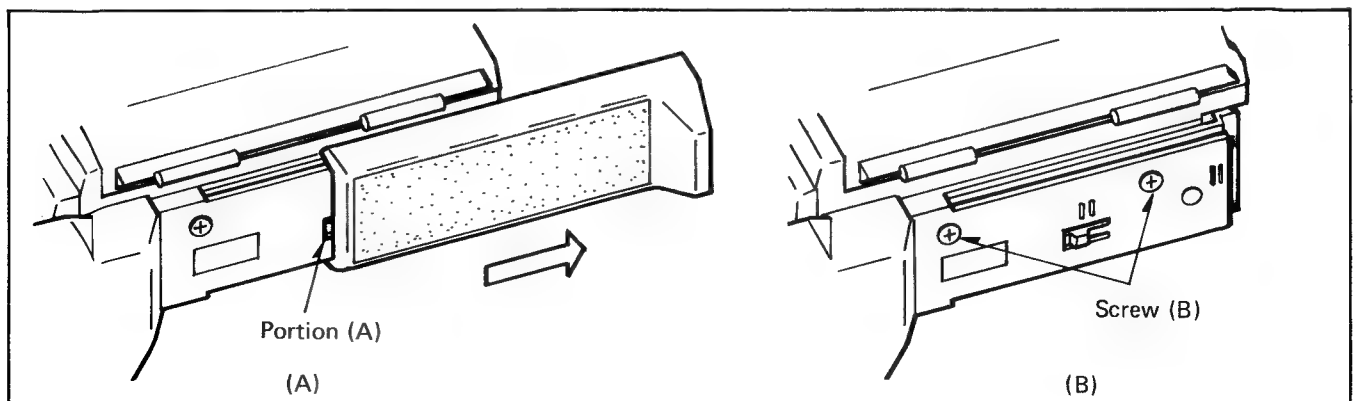


Fig. 1.

- b. Move the right side cover to the rear.
- c. Remove the right side cover.
- d. Disconnect the flexible wire and a connector (P604).

2-4. Opening of Deflection Circuit Board

- a. Remove the switch case.
- b. Disconnect a flexible wire.
- c. Unscrew 2 screws securing the circuit board to the chassis.

2-5. Opening of Process Circuit Board

Unscrew 2 screws securing the circuit board to the chassis.

3. REPLACEMENT OF THE PICK-UP TUBE

3-1. Remove the both side covers and open the process circuit and deflection circuit boards (refer to section "Disassembly Method").

3-2. Disconnect 2 connectors (P602, P603) (see Fig. 2).

3-3. Unscrew 4 screws (A) and 2 screws (B) (see Fig. 2)

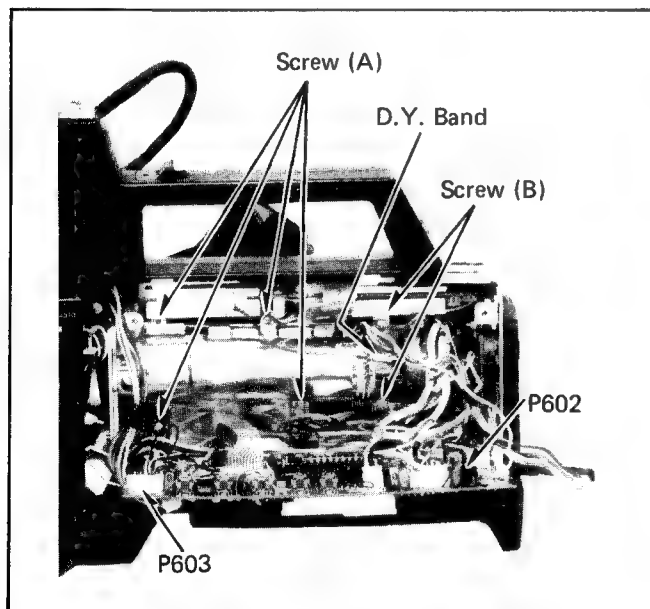


Fig. 2. Right Side View

3-4. Then, remove the D.Y. band.
Unsolder and remove a green lead and the preamp shield cover (see Fig. 3).

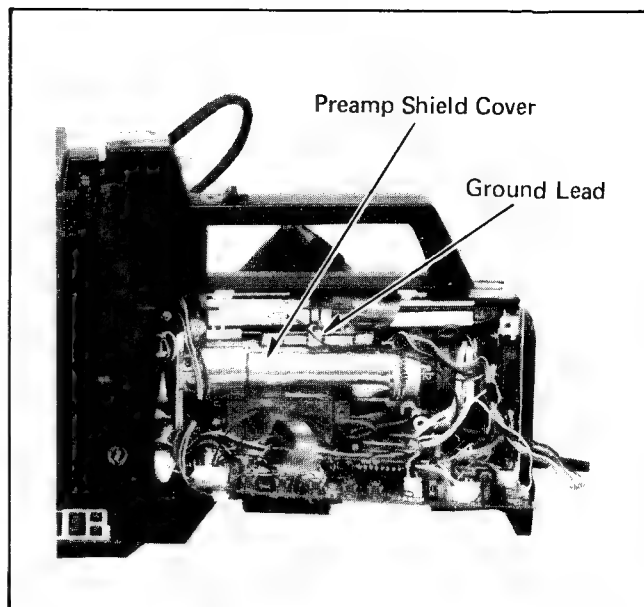


Fig. 3. Right Side View

3-5. Unsolder and remove a white lead from the preamp circuit board (see Fig. 4).

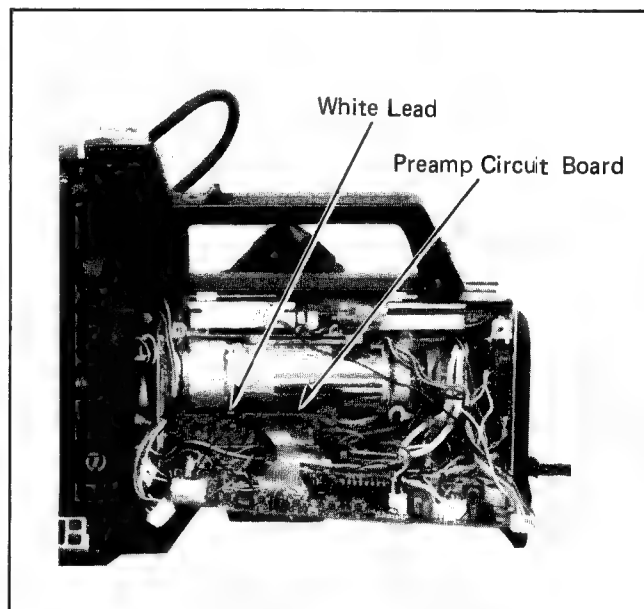


Fig. 4. Right Side View

3-6. Remove the back cover assembly (rear side).
Unscrew 2 screws (c) and remove the rear side circuit board (see Fig. 5).

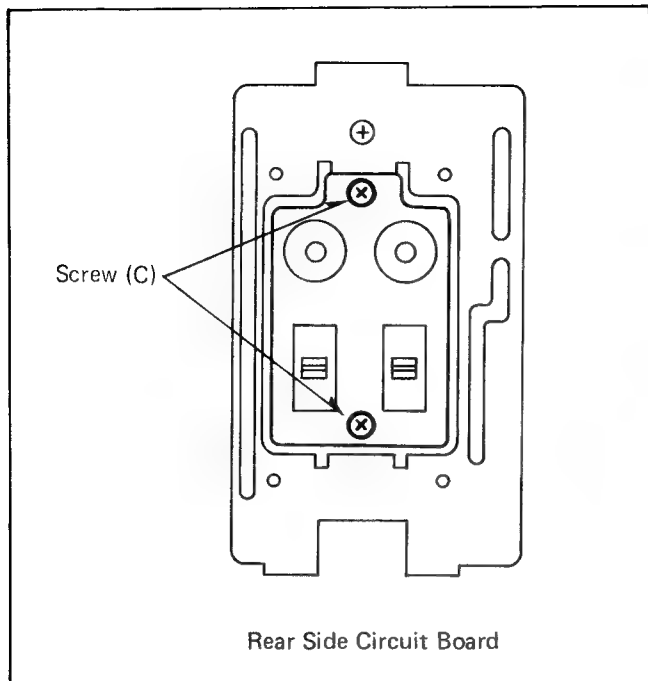


Fig. 5.

- 3-7. Remove the pick-up tube socket circuit board and the bias light holder from the pick-up tube. (see Fig. 6)

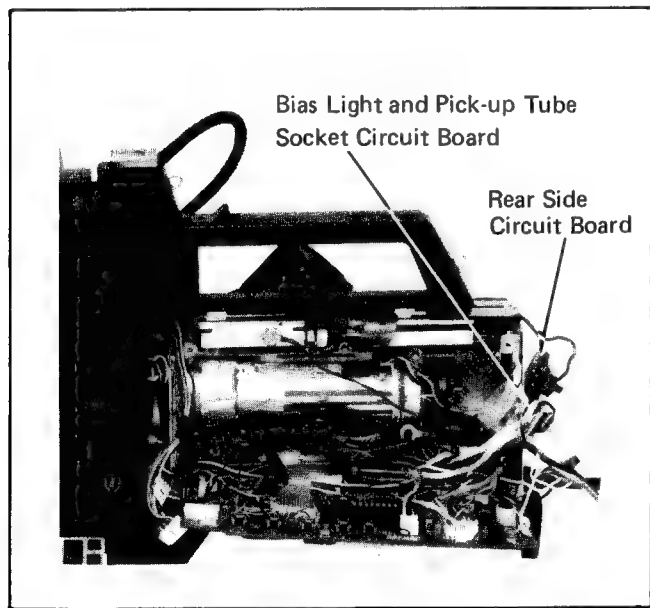


Fig. 6. Right Side View

- 3-8. Remove the pick-up tube D.Y. assembly with the filter assembly (see Fig. 7).
- 3-9. Remove the filter assembly and the D.Y. spring from the pick-up tube D.Y. assembly (see Fig. 7)

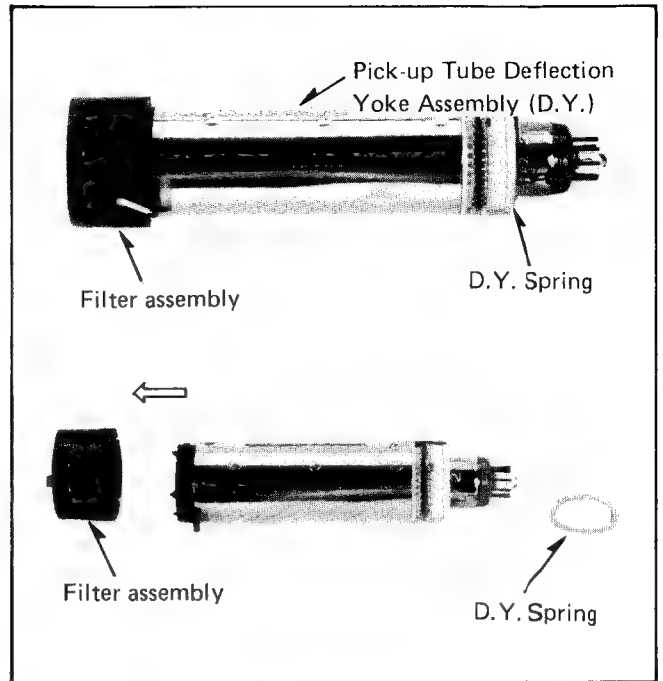


Fig. 7.

- 3-10. Loosen the clamp screw and remove the pick-up tube from the deflection yoke assembly (D.Y.) (see Fig. 8)

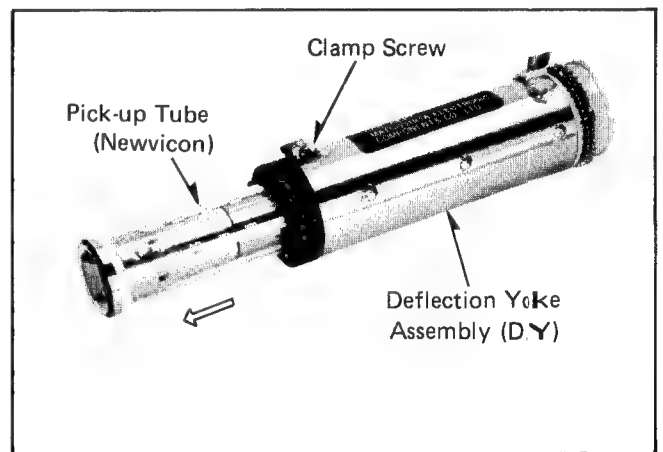


Fig. 8. Pick-up Tube and D.Y.

- 3-11. Install the new pick-up tube (S4165) in the deflection yoke assembly (see Fig. 9).

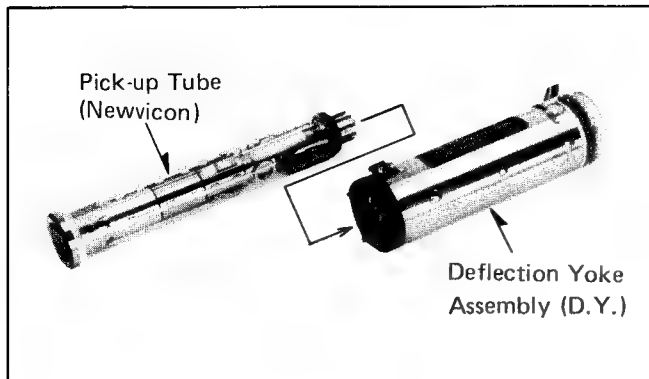


Fig. 9. Pick-up Tube and D.Y.

- 3-12. Line up the plastic tab on the D.Y assembly with the silver line on the face of the pick-up tube as shown in Fig. 10.

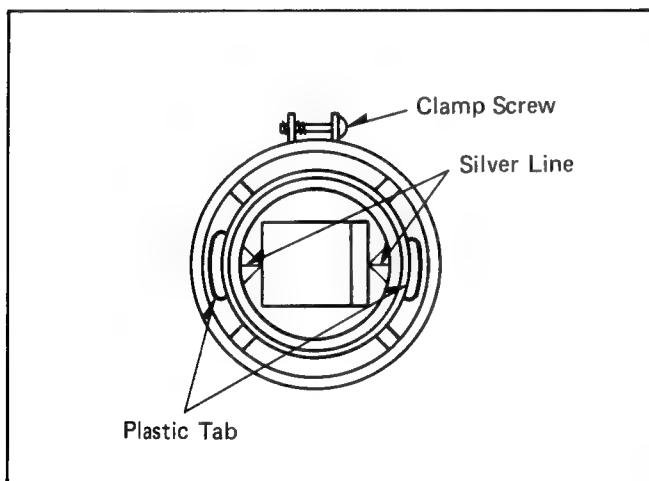


Fig. 10.

- 3-13. Push the pick-up tube in the D.Y assembly as far as it will go... using lens cleaning tissue paper to keep the face plate spotless (Fig. 11).

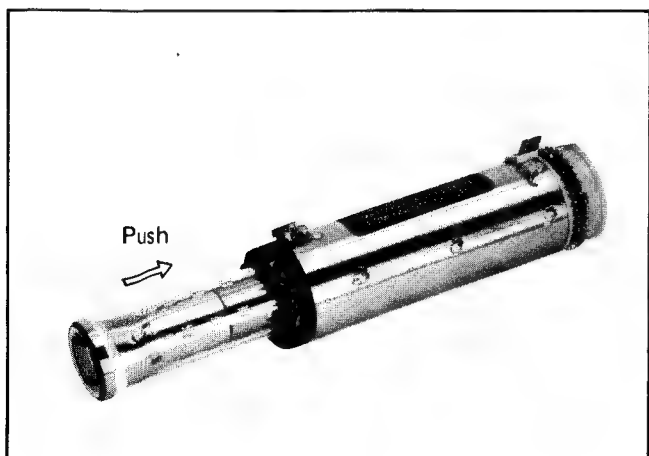


Fig. 11.

- 3-14. Reverse the previous steps.

4. REPLACEMENT OF THE POWER ZOOM LENS

- 4-1. Remove the both side covers, open the process circuit and the deflection circuit boards (refer to section "Disassembly Method").
- 4-2. Unscrew 4 screws (A) and remove the A.V.R circuit board (see Fig. 12-A/B).

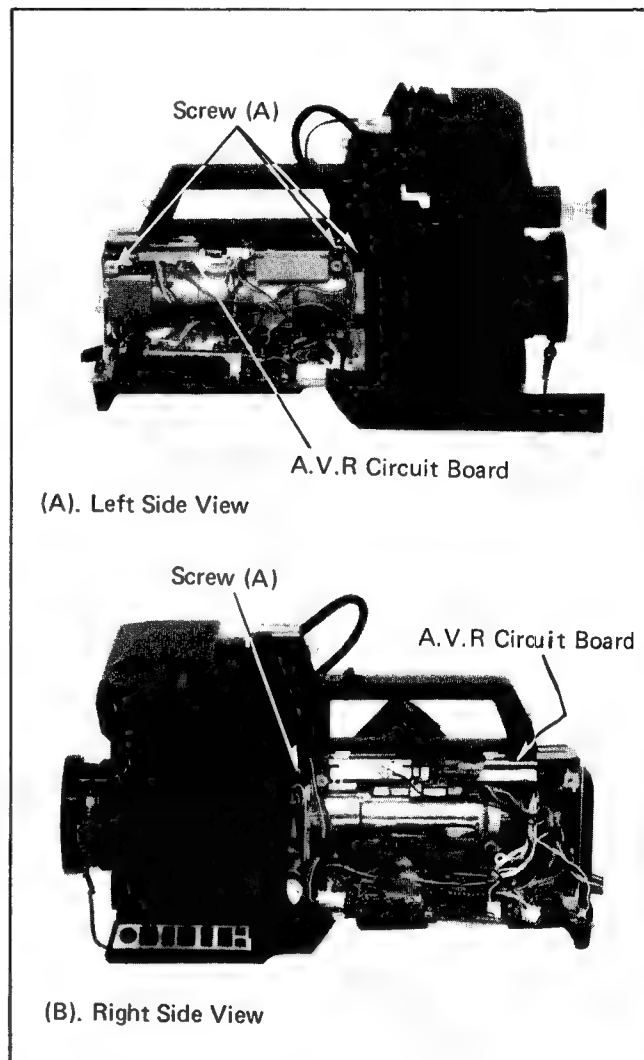


Fig. 12.

- 4-3. Disconnect 3 connectors (P704, P302, P309) (see Fig. 13).

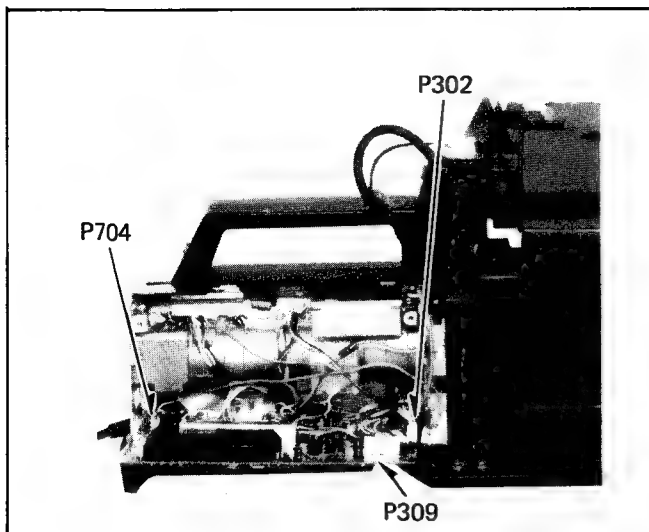


Fig. 13. Left Side View

- 4-4. Unscrew 4 screws (B) and remove the zoom lens (see Fig. 14-A/B).
Then, disconnect a connector (M).

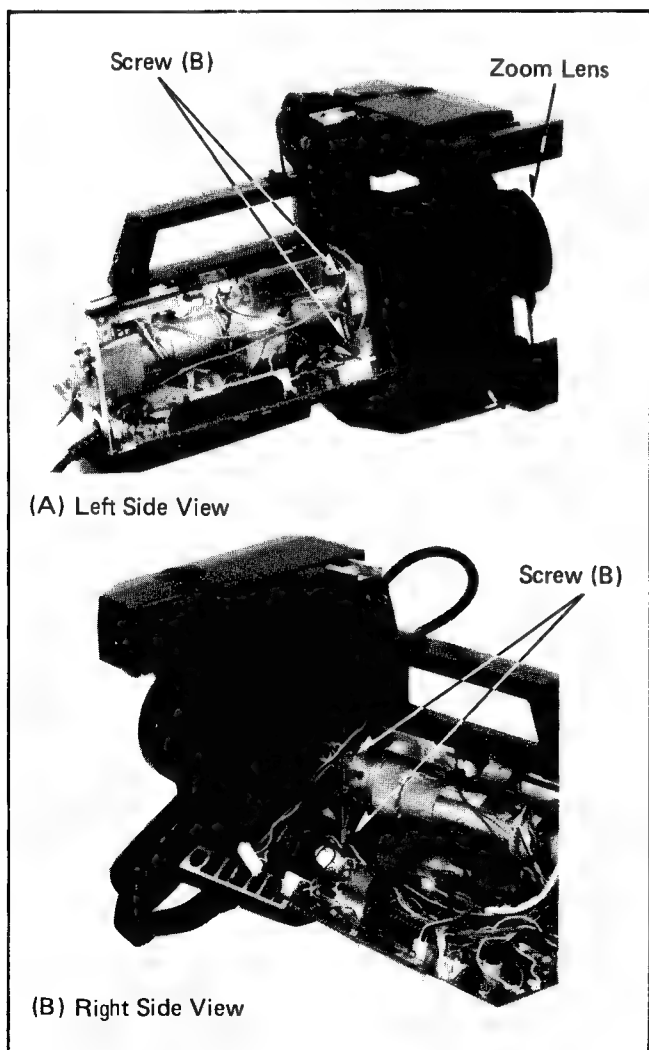


Fig. 14.

- 4-5. Install the new zoom lens...
using lens cleaning tissue paper to keep the lens spotless.

- 4-6. Reverse the previous steps.

5. REPLACEMENT OF ZOOM MOTOR (VEKW0780)

- 5-1. Remove the zoom lens.
(refer to section "Replacement of the Power Zoom Lens").
- 5-2. Unscrew 6 screws (A) and remove the A.F. cover (see Fig. 15).

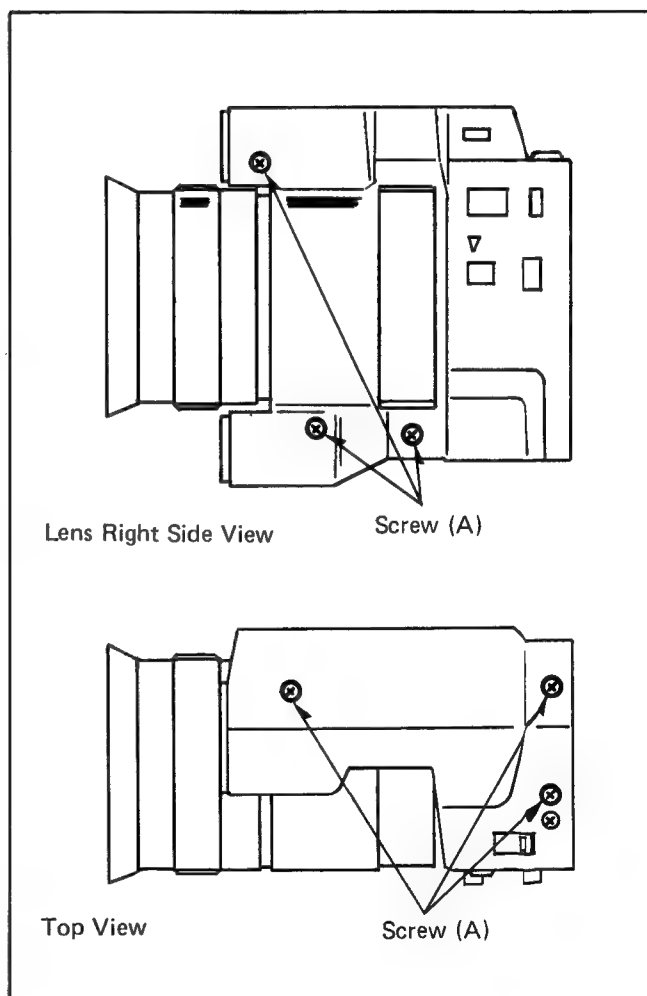


Fig. 15.

- 5-3. Unscrew a screw (C) and open the auto focus [A] circuit board (see Fig. 16).
- 5-4. Unscrew 2 screws (D) and remove the zoom motor (see Fig. 16).

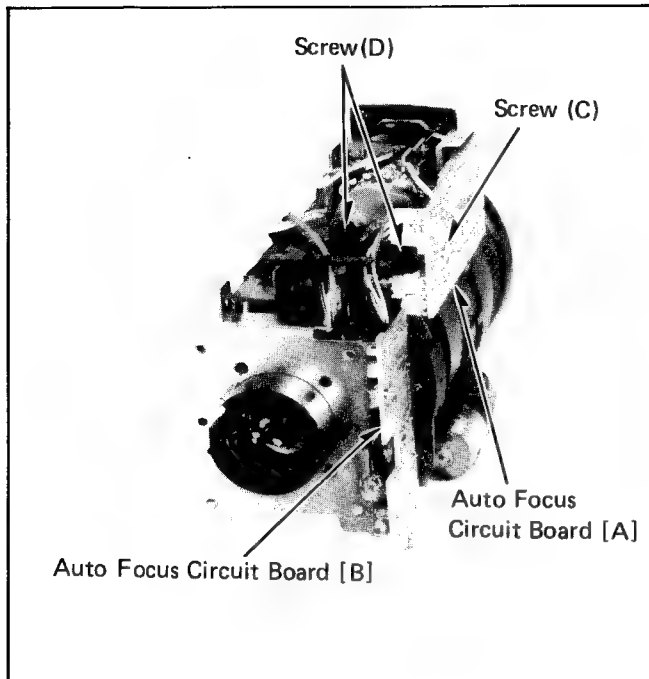


Fig. 16 Lens and Zoom Motor

- 5-5. Install the new zoom motor.
- 5-6. Before assembling the power zoom lens to the chassis, confirm that there are no dust on the lens surface.
- 5-7. Reverse the previous steps.

6. REPLACEMENT OF AUTO FOCUS MOTOR (VEKW0779)

- 6-1. Remove the power zoom lens (refer to section "Replacement the Power Zoom Lens").
- 6-2. Remove the A.F. cover (refer to section "Replacement of Zoom Motor").
- 6-3. Unscrew 2 screws (A) and a screw (B). Then, remove the auto focus motor assembly (see Fig. 17-A/B).

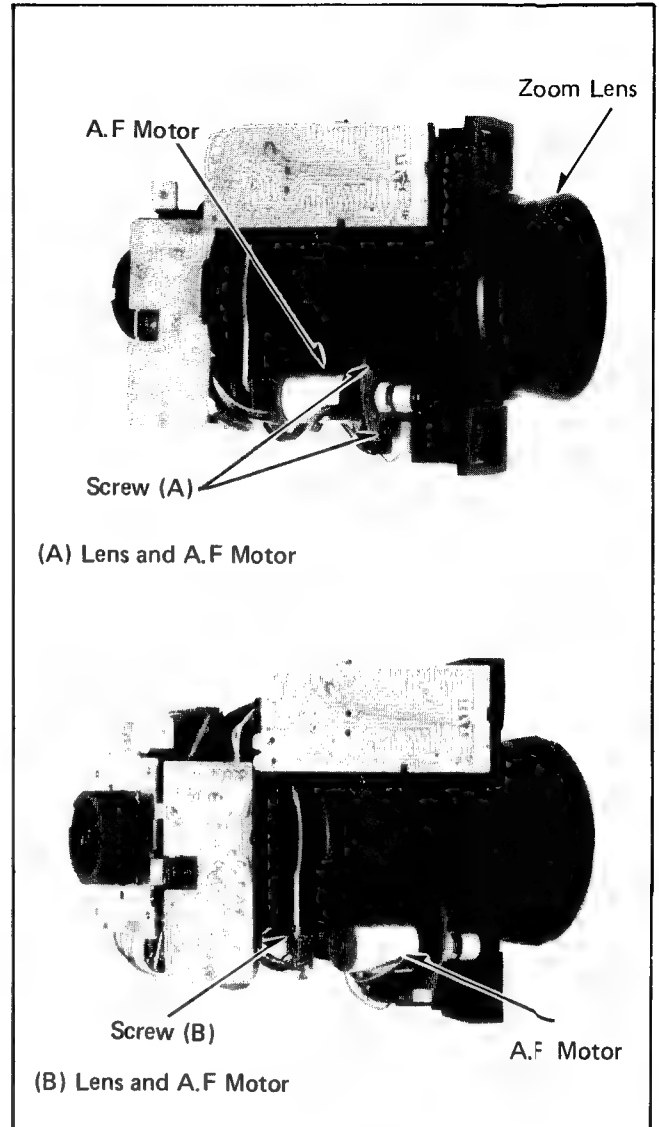


Fig. 17.

7. REPLACEMENT OF IRIS MOTOR ASSEMBLY (VVAW0020)

- 7-1. Remove the power zoom lens (refer to section "Replacement of the Power Zoom Lens").
- 7-2. Remove the A.F. cover (refer to section "Replacement of Zoom Motor").
- 7-3. Unscrew 2 screws (A) and remove the auto focus [B] circuit board (see Fig. 18).

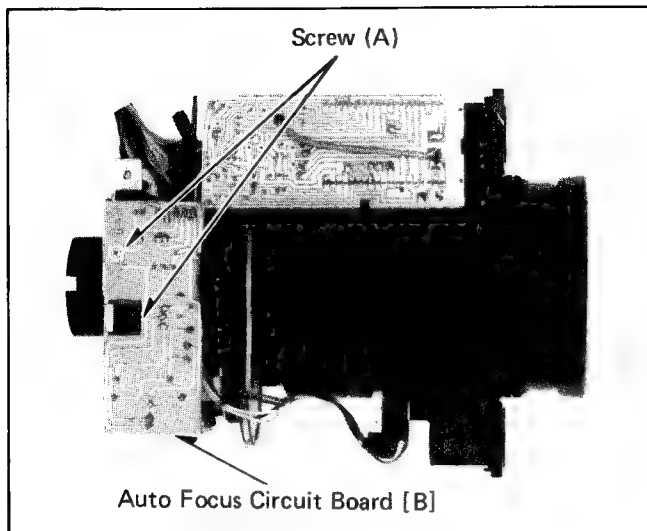


Fig. 18.

7-4. Unscrew 4 screws (B) and remove the hex screw and unscrew a screw (C).
Then, remove the relay lens adjustment screw holder and the relay lens adjustment screw (see Fig. 19-A/B).

7-5. Remove the chassis.

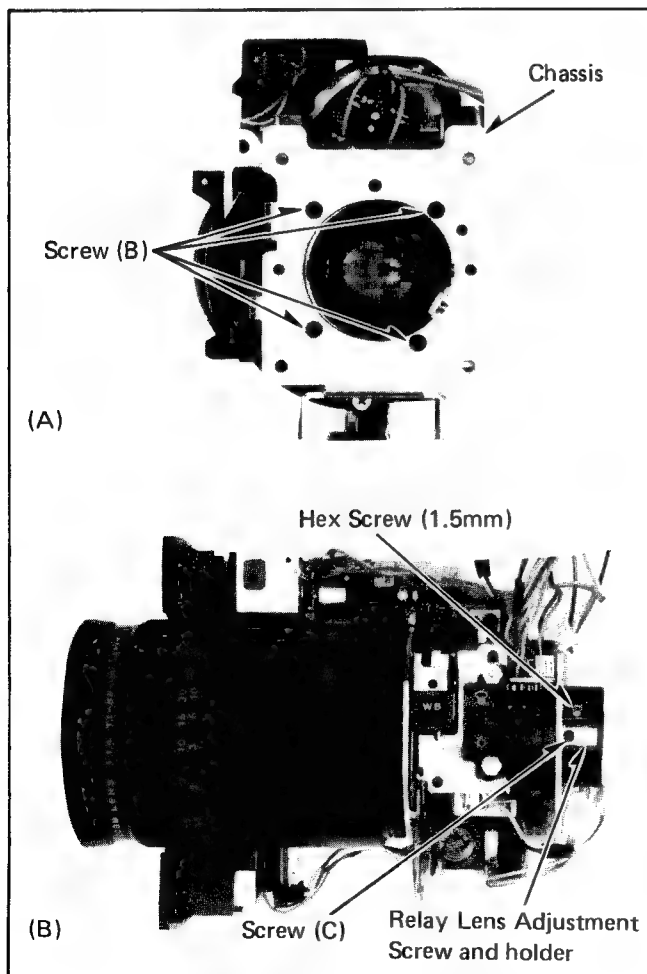


Fig. 19.

7-6. Unscrew 2 screws (D) and remove the filter holder assembly (see Fig. 20-A/B).

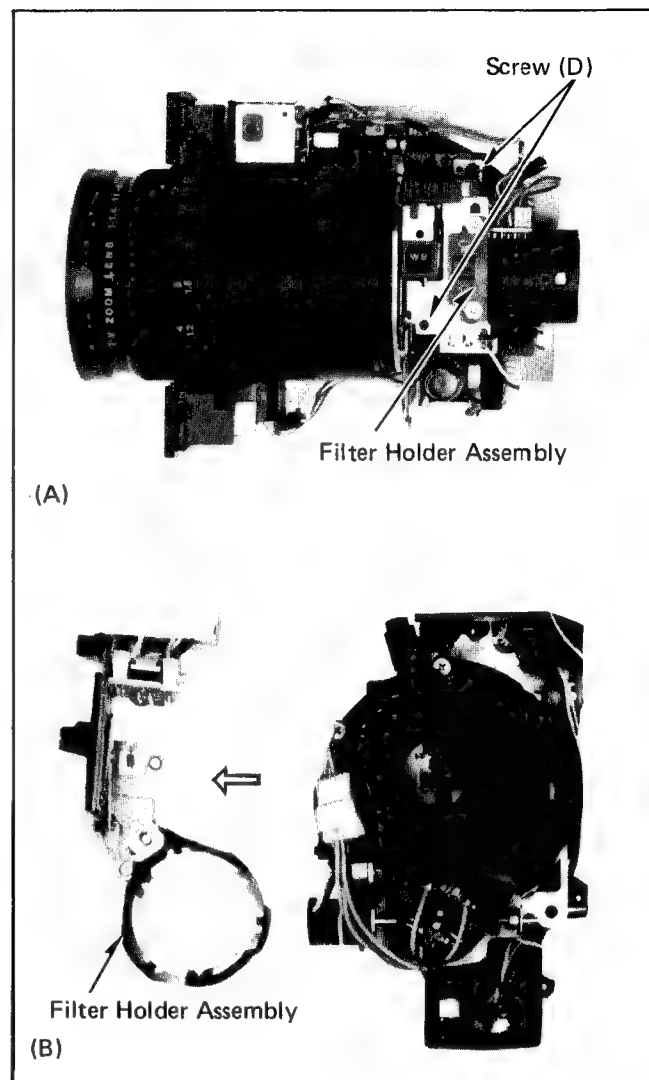


Fig. 20.

7-7. Unscrew 4 screws (E) and remove relay lens assembly with iris motor assembly (see Fig. 21-A/B).

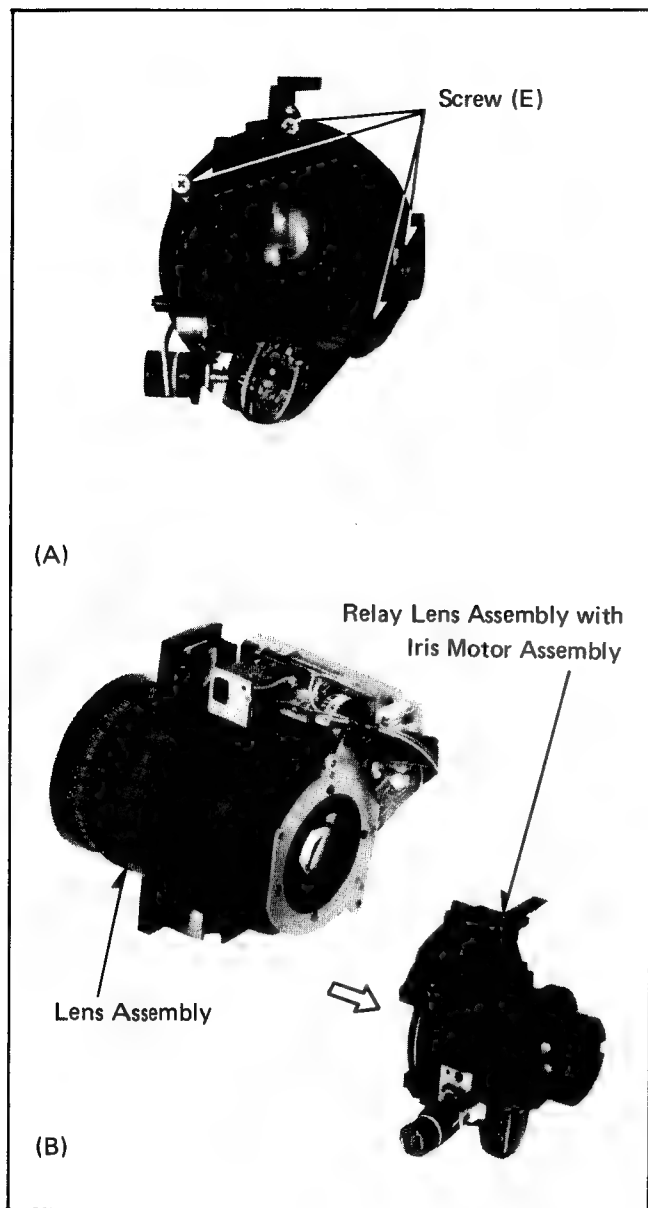


Fig. 21.

7-8. Unscrew 3 screws (F) and remove the iris motor assembly (see Fig. 22-A/B).

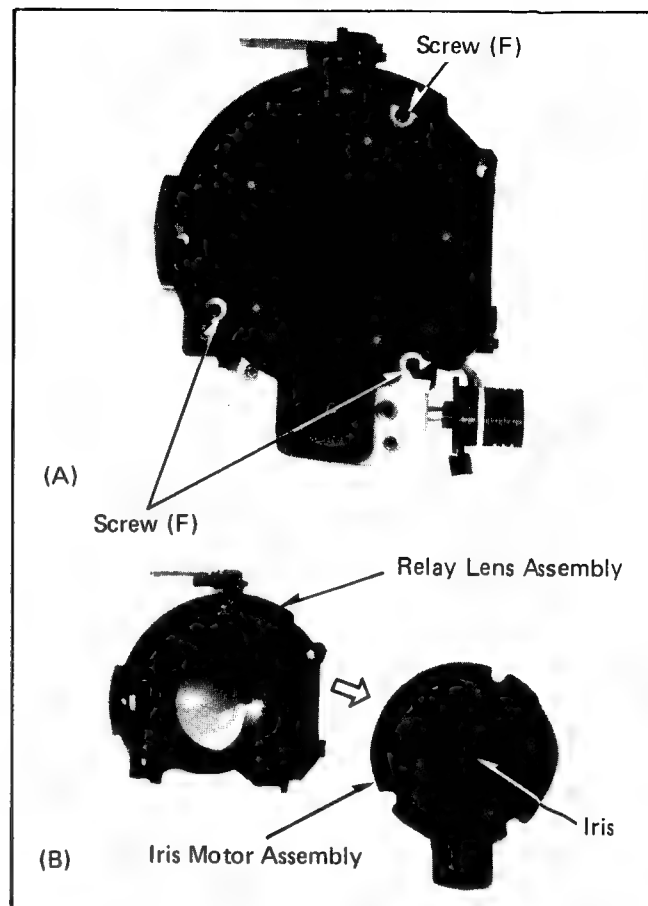


Fig. 22.

7-9. Install the new iris motor assembly... before assembly of the iris motor assembly to the chassis, confirm that there are no dust on the iris motor assembly.

7-10. Reverse previous steps.

TEST EQUIPMENT/TOOL LIST

1. Light Box w/Chart

	Part Number
Light Box w/Chart Set . . .	VFKS002
Gray Scale Chart	VFKS002A
Color Chart	VFKS002B
Registration Chart	VFKS002C
Resolution Chart	VFKS002D
Light Box	VFKS002Y

Reflection Chart

	Part Number
Reflection Chart Set . . .	VFKS003
Gray Scale Chart	VFKS003A
Color Chart	VFKS003B
Registration Chart	VFKS003C
Resolution Chart	VFKS003D
Color Sheet	VFKS003E

2. 3200°K Studio Light (See your local photo supply dealer): Minimum requirement is 2 flood lights about 350-500 watts each.

3. Luxmeter

We recommend one of the following:

- A. Portable luxmeter Model No. 3281 by Yokogawa
Yokogawa Corporation of America
2 Dart Road Shenandoah, GA 30265
- B. Electronic Foot Candle Meter by Panlux
Berkey Marketing Company
25-30 Brooklyn Queens Expressway Woodside,
New York 11377

4. FM Detector

Part No. ----- VFKS001C

5. Oscilloscope

Dual Trace, 25MHz, 2mV/DIV.

Minimum Sensitivity with Delay Mode.

6. Vector Scope

7. VTVM or Digital Voltmeter

8. Tripod

9. Frequency Counter

10. Hex Wrench (1.5mm/7mm).

Electrical Adjustment Procedures

Preparations:

To achieve the best adjustment results, warm up the camera for approximately 30 minutes before adjusting.

To prevent short-circuits between the camera body and the undersides of the process and deflection circuit boards, place insulating tape on those portions of the circuit boards that may come in contact with the camera body.

Note:

All board drawings and adjustments are referenced to the foil side of the printed circuit board.

[1] +9V ADJUSTMENT

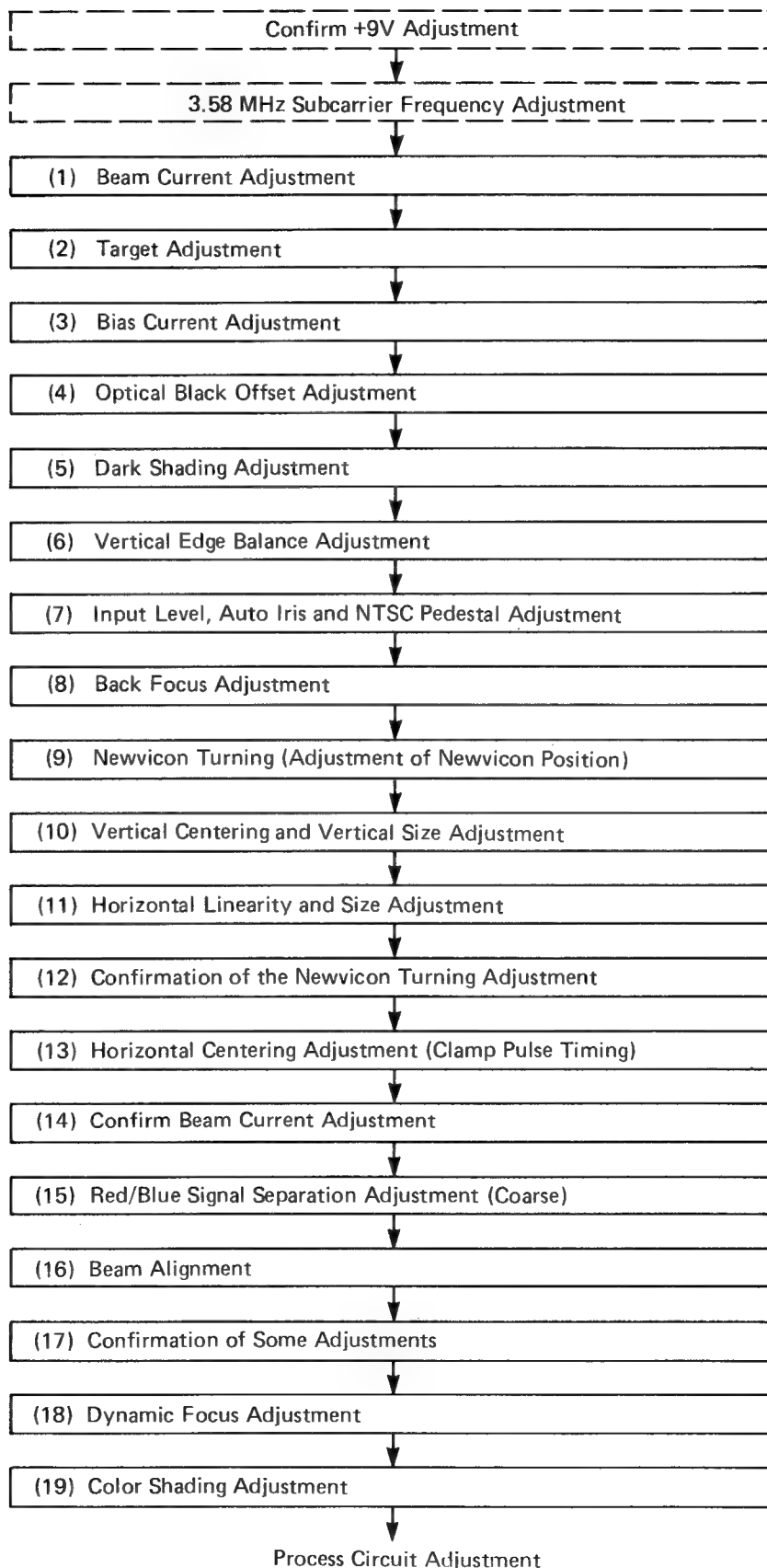
Cautions:

Adjust the voltage to +9 volts. This adjustment should always be performed before any other camera adjustments as voltage adjustment will affect overall camera adjustment. Unless complete camera alignment is to be performed, it is not necessary to adjust the voltage if the error is less than ± 0.02 volts.

1. To adjust the voltage to +9 volts, connect a voltmeter to the +9 volt regulator at test point TP505 on the deflection circuit board.
2. Adjust +9V control VR6001 so that the voltmeter indicates +9 volts ± 0.01 volts.

(2) DEFLECTION CIRCUIT ADJUSTMENT

ADJUSTMENT FLOW CHART OF DEFLECTION CIRCUIT (BOARD)



Preparation:

1. Preset the following.
 - a. R/B Color Control Knobs
(White Balance)
... Center position (Detent position)
 - b. Iris Control Switch
... Manual and Close position
 - c. Color Temperature Correction Switch
... Indoor position
 - d. Standby Switch
... Operate position
 - e. Negative/Positive Reverse Switch
... Normal position

2. Release the Dynamic Focus.

Note:

For this procedure, use test point TP609 as the external trigger for the vertical adjustment, and test point TP610 as the external trigger for the horizontal adjustment. This will ensure the flattest response.

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP607	VR611 VR612 VR613 VR614	/	Scope	TP609 VSS TP610 HSS

- a. First, with the iris control switch, set to the manual, and close the iris, then observe the signal at the horizontal rate at test point TP607.
- b. Trigger the oscilloscope with test point TP610.
- c. Adjust the horizontal sawtooth control VR611 and the horizontal parabola control VR612 so that the signal waveform is flattest during the horizontal period as shown in Fig. 1.

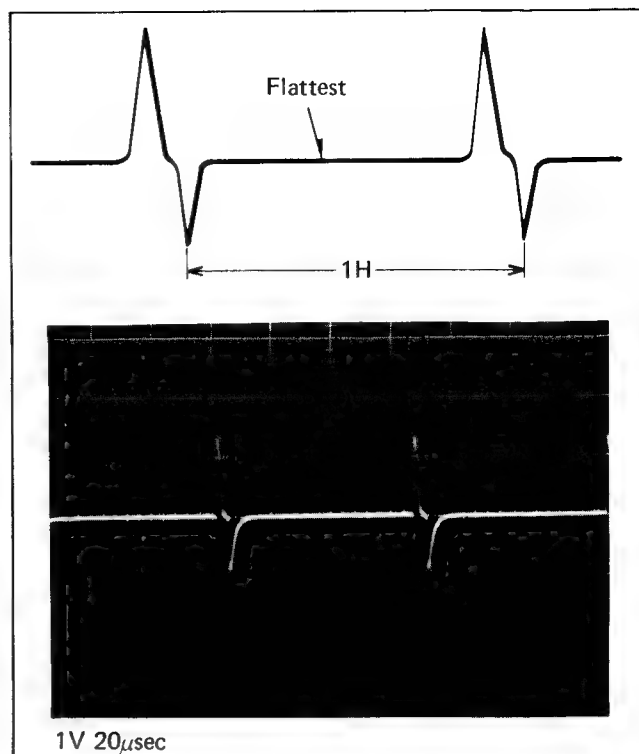


Fig. 1

- d. Now, observe the signal at the vertical rate at test point TP607, and adjust the vertical parabola control VR613 and the vertical sawtooth control VR614 so that the signal waveform is flattest during the vertical period as shown in Fig. 2. Trigger the oscilloscope with test point TP609.

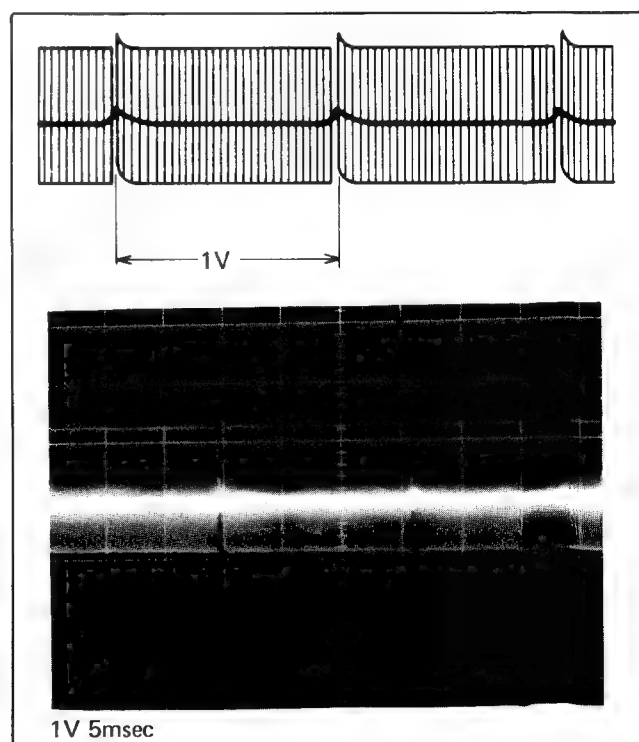


Fig. 2

- Release the color shading.
Turn VR310, VR311, VR312, VR313, VR314, VR315, VR316 and VR317 to the center position as shown in Fig. 3.

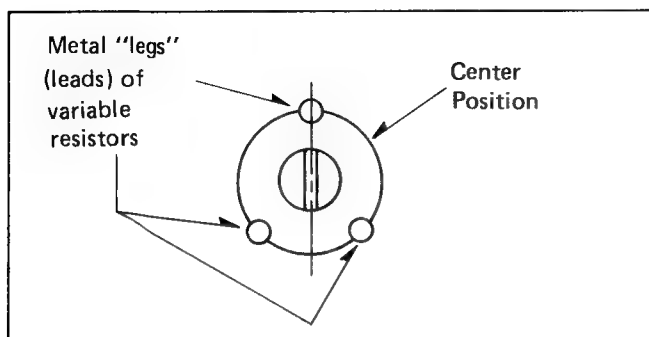


Fig. 3

- Release the high luminance chroma clip circuit.
Turn VR330 fully clockwise from the foil side of the circuit board.
- 3.58 MHz SUB-CARRIER FREQUENCY ADJUSTMENT**

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP311	C346	/	Frequency Counter	/

- Measure the sub-carrier frequency at TP311.
- Adjust capacitor C346 so that the frequency counter indicates $3.579545\text{MHz} \pm 50\text{Hz}$.

(1) BEAM CURRENT ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301 TP604 TP608	VR605	White Light Box	Scope	TP610 HSS

- Set the iris control switch to auto.
- Connect the oscilloscope to test point TP301 and observe the signal at the horizontal rate.
- Connect a $33\mu/16\text{V}$ capacitor between TP604 and TP608.
Trigger the scope using TP610.
- Aim the camera at the far left edge of a light box or other small light source in order to saturate the beam (waveform does not increase).

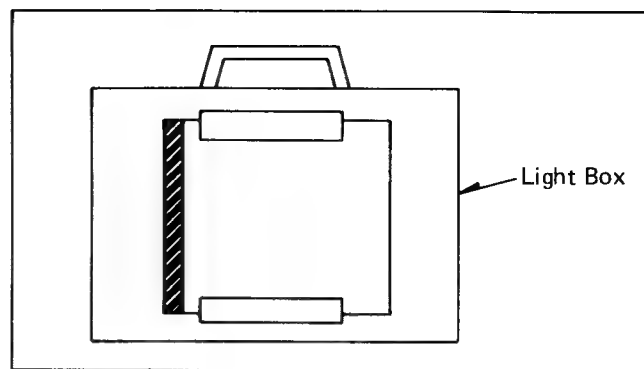


Fig. 4

Note:

Use a low ambient room light when performing this procedure. If lighting is too high, then close the iris manually.

- Adjust the beam control VR605 so that signal clipping occurs at 2.0 volts peak-to-peak. (See Fig. 5.)

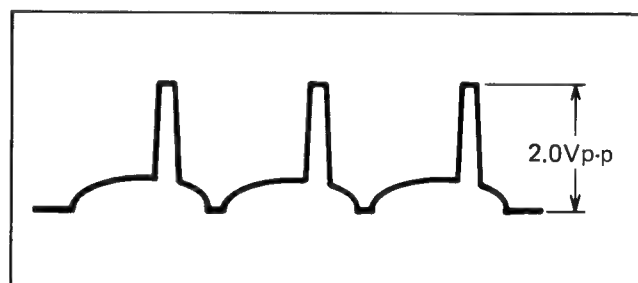


Fig. 5

If the signal is less than 2.0V peak-to-peak, use a more intense light source.

Be careful not to damage the pick-up tube with too strong a light.

- Disconnect the $33\mu/16\text{V}$ capacitor.

(2) TARGET ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP603	VR603	/	Voltmeter	/

Note:

Before making any adjustments, wait 5 seconds after closing the lens to allow the dark current to stabilize.

- Set the iris control switch to the manual, and close the iris.
- Connect the voltmeter to test point TP603 on the deflection circuit board.
- Wait 5 seconds after closing the lens to allow the dark current to stabilize.

- Now adjust the target control VR603 so that the voltage at TP603 is equal to the Esj value stamped on the Newvicon neck plus 1V.
(Voltage at TP603 = Esj value +1V)

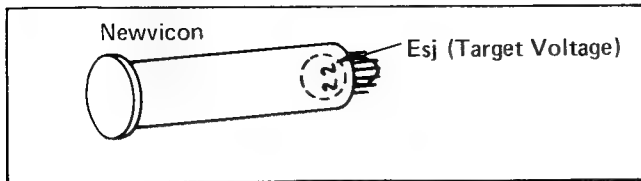


Fig. 6

(3) BIAS CURRENT ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301	VR606	/	Scope	TP609 VSS

- Set the iris control switch to the manual, and close the iris.
- Connect the oscilloscope to test point TP301 and observe the signal at the vertical rate.
Trigger the oscilloscope with test point TP609.
- Adjust VR606 so that the waveform level is 50mVp-p.

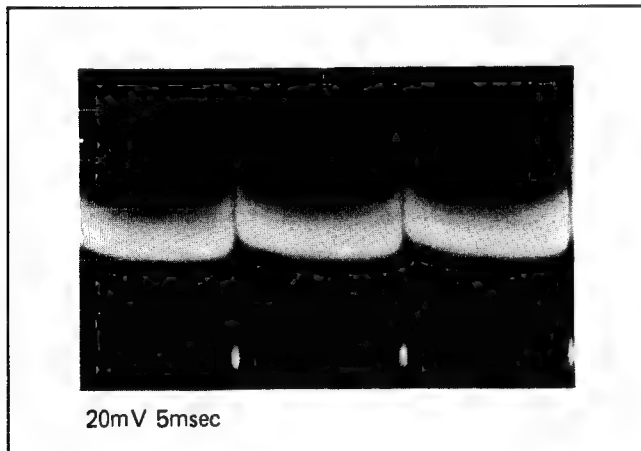


Fig. 7

(4) OPTICAL BLACK OFFSET ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP303	VR304	/	Scope	TP609 VSS

Note:

Before starting this adjustment, set the iris control switch to the manual and close the iris, and wait 10 seconds.

- Set the sensitivity (standby) switch to the gain up position.
- Connect the oscilloscope to test point TP303 and observe the signal at the vertical rate.
Trigger the oscilloscope with test point TP609.
- Adjust the optical black offset control VR304 so that the waveform level is about 0mVp-p. (Use center of carrier leakage.)

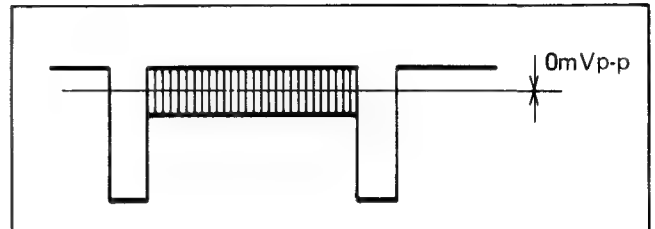


Fig. 8

- Set the sensitivity (standby) switch to the operate position.

(5) DARK SHADING ADJUSTMENT

Note:

Before starting this adjustment, set the iris control switch to manual and close the iris, and wait 10 seconds.

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP303	VR607, VR608 VR609, VR610	/	Scope	TP609 VSS TP610 HSS

- Set the sensitivity (standby) switch to the gain up position.
- Connect the oscilloscope to test point TP303 and observe the signal at the vertical rate.
Trigger the oscilloscope with test point TP609.
- Adjust the dark shading control (V. Para.), VR609 and the dark shading control (V. Saw.), VR610 so that the signal waveform is flattest during the vertical period as shown in Fig. 9.

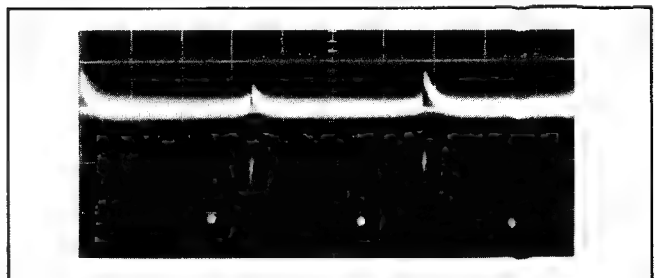


Fig. 9

- Now, observe the signal at the horizontal rate at test point TP303, and adjust the dark shading control (H. Saw.), VR607 and the dark shading control (H. Para.), VR608 so that the signal waveform is flattest during the horizontal period as shown in Fig. 10.
Trigger the oscilloscope with test point TP610.

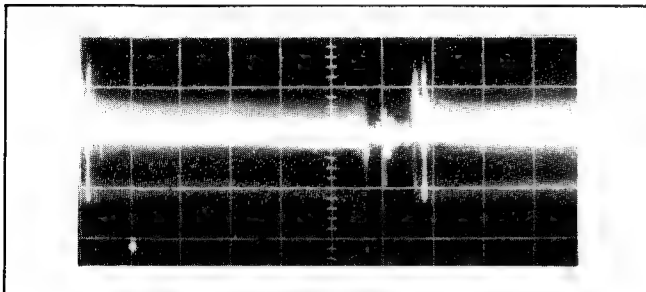


Fig. 10

- Check the optical black offset adjustment and, if necessary, readjust the optical black offset control VR304.
- Set the sensitivity (standby) switch to the operate position.
- Finally, set the iris control to auto.

(6) VERTICAL EDGE BALANCE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP313 YL Signal	VR332 Bias Control	Gray Scale	Scope	TP609 VSS
TP312 V-Edge Correction Signal	VR333 V-Edge Gain VR334 V-Edge Bal.			TP610 HSS

- Aim the camera at the gray scale chart.
- Connect the oscilloscope to test point TP313 and observe the signal at the horizontal rate.
Trigger the oscilloscope with test point TP610.
- Adjust the bias control, VR332, so that the YL signal is maximized, as shown in Fig. 11.

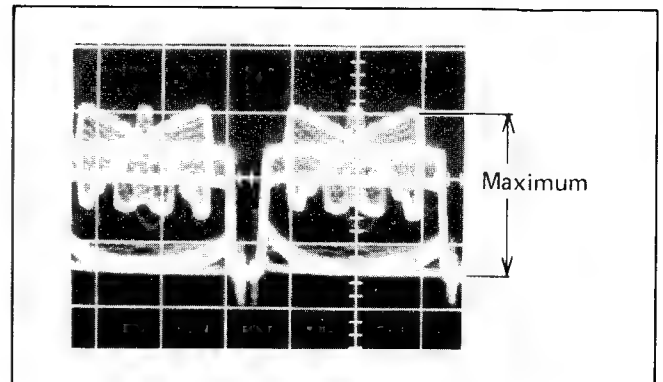


Fig. 11

- Then, connect the oscilloscope to test point TP312 and observe the vertical edge correction signal at the vertical rate.
Trigger the oscilloscope with test point TP609.
- Adjust the vertical edge balance control VR334 so that the vertical edge correction signal is minimized, as shown Fig. 12.

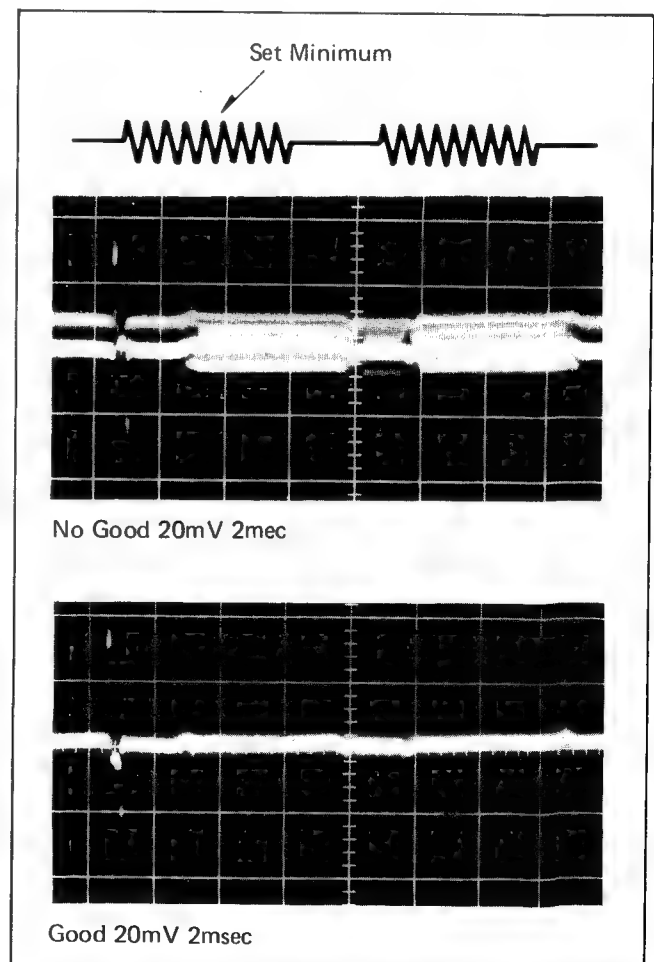


Fig. 12 Vertical Edge Correction Signal at TP311

- Observe the picture on the monitor and adjust Vertical Edge Gain Control VR333 until the color fringing on the upper and lower edges of the gray scale is eliminated. (Coarse)

(7) INPUT LEVEL, AUTO IRIS AND NTSC PEDESTAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301	VR301	Gray Scale	Scope	TP610 HSS
TP302	VR302			
TP318	VR330			
	VR604			

Note:

If a reflection type gray scale chart is used, a light intensity of between 1,400 and 2,000 lux will be required.

- Aim the camera at the gray scale chart and set iris control to "Auto".
- Connect the oscilloscope to test point TP301 and observe the signal at the horizontal rate. Trigger the oscilloscope with test point TP610.
- Then to release the carrier signal, turn focus control VR604 fully clockwise (from foil side of the circuit board).
- Adjust VR301 to 600mVp-p.

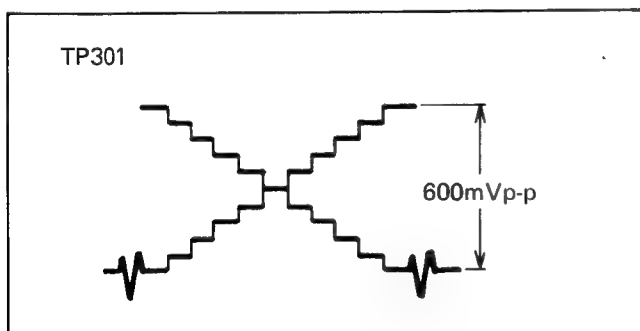


Fig. 13

- Connect the oscilloscope to test point TP302 and observe the signal at the horizontal rate.
- Adjust the focus control VR604 so that the signal level is maximized.
- Set iris control to manual and close the lens iris.
- Connect the oscilloscope to test point TP318 and observe the NTSC signal.

- Check the NTSC pedestal as shown in Fig. 14.
- If NTSC Pedestal is not proper level, readjust the OB offset adjustment (step 4), dark shading adjustment (step 5), vertical edge balance adjustment (step 6) if necessary.

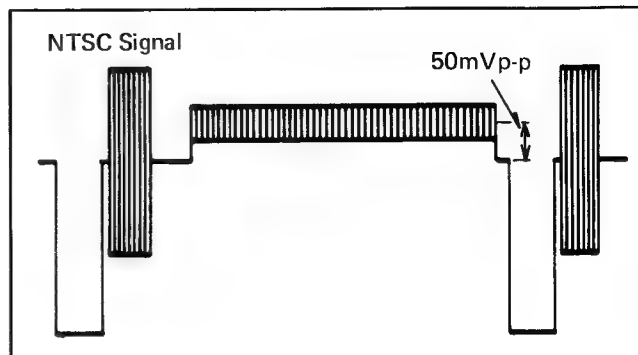


Fig. 14

- Set iris control to auto and aim the camera at the gray scale chart.
- Now, observe the NTSC signal at the horizontal rate at test point TP318.
- Turn VR330 fully counterclockwise position, to reduce the carrier signal.
- Adjust VR302 to 0.7Vp-p.
- Turn VR330 fully clockwise.
- Confirm that signal at TP301 is 600mVp-p. If it is not then readjust.

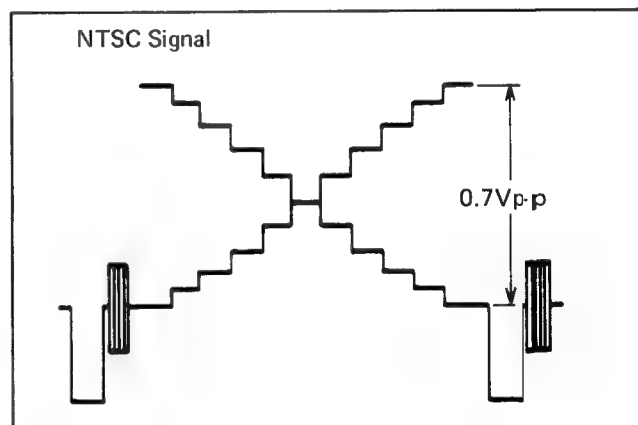


Fig. 15

(8) BACK FOCUS ADJUSTMENT

- Aim the camera at an object more than 10 meters (33 feet) away, and zoom all the way in (maximum close up).
- Focus the lens on the object.
- Loosen the hex screw using a 1.5mm hex wrench on the relay lens. (See Fig. 16.)

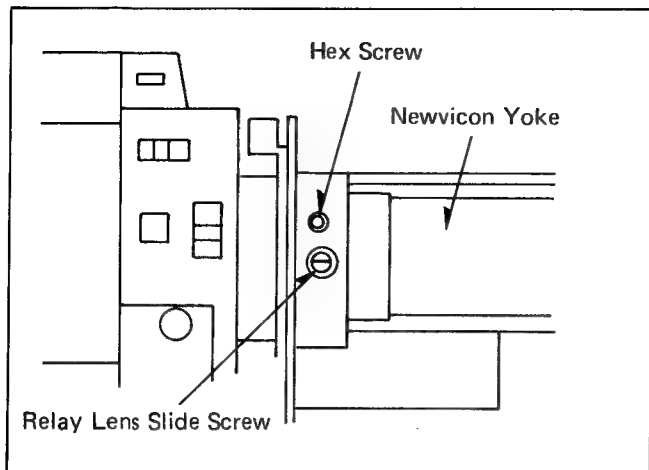


Fig. 16

4. Zoom all the way back and adjust the relay lens slide screw until the sharpest focus is obtained.
5. Repeat this procedure--zoom in, focus, zoom out, and adjust--until the best focus is obtained over the entire zoom range.
6. Tighten the hex screw using a 1.5mm hex wrench on the relay lens.
Do not overtighten the hex screw.
You may crack the lens assembly or the lens housing.

(9) NEWVICON TURNING (ADJUSTMENT OF NEWVICON POSITION)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP302	VR604 Newvicon Turning	White	Scope	TP609 VSS

1. Aim the camera at a white chart or white screen and focus the lens.
2. Connect the oscilloscope to test point TP302 and observe the signal at the vertical rate.
Trigger the oscilloscope with test point TP609.
3. Adjust Focus Control VR604 for maximum signal level as shown in Fig. 17.

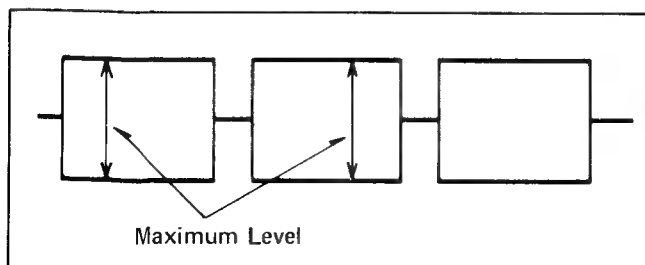


Fig. 17

4. Delay the sweep of the center portion of the vertical signal waveform and observe a few horizontal lines.
5. Loosen the newvicon clamp screw on the deflection yoke assembly as shown in Fig. 18.

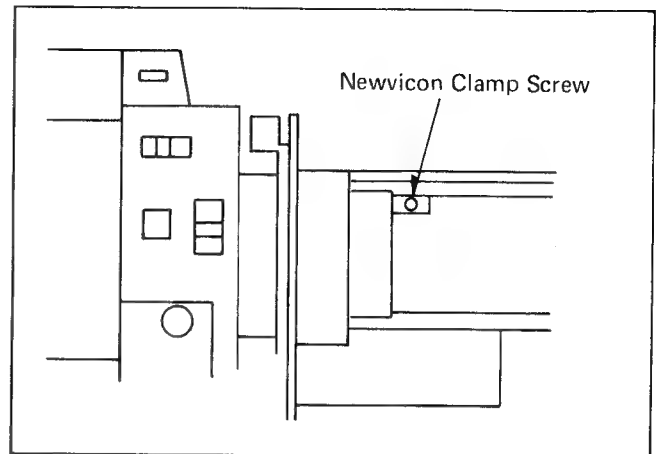


Fig. 18

6. Remove the rear panel, unscrew two screws and remove the rear side circuit board.
7. Now, rotate the newvicon socket from the back, using a 7mm hex wrench, so that the waveform for each horizontal scan line is free from beat and ripple.
Do not worry about differences in amplitude.

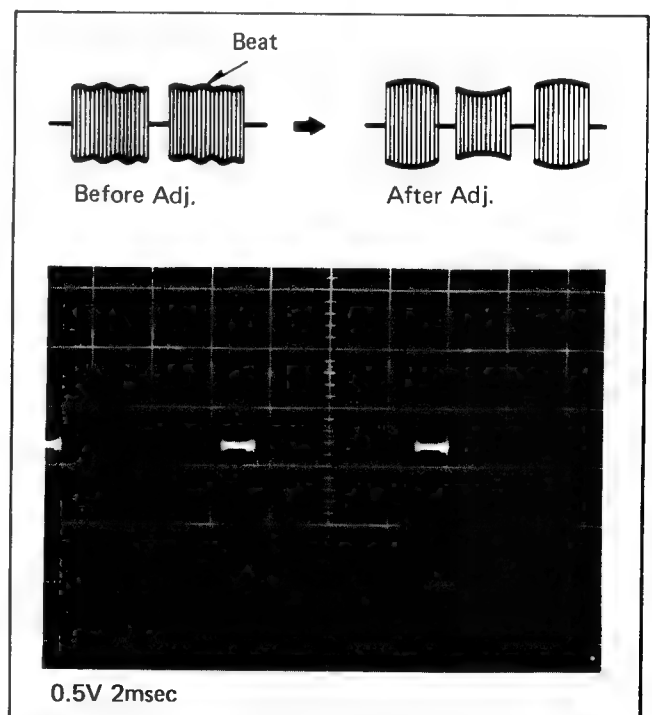


Fig. 19 Waveform of Proper Newvicon Turning

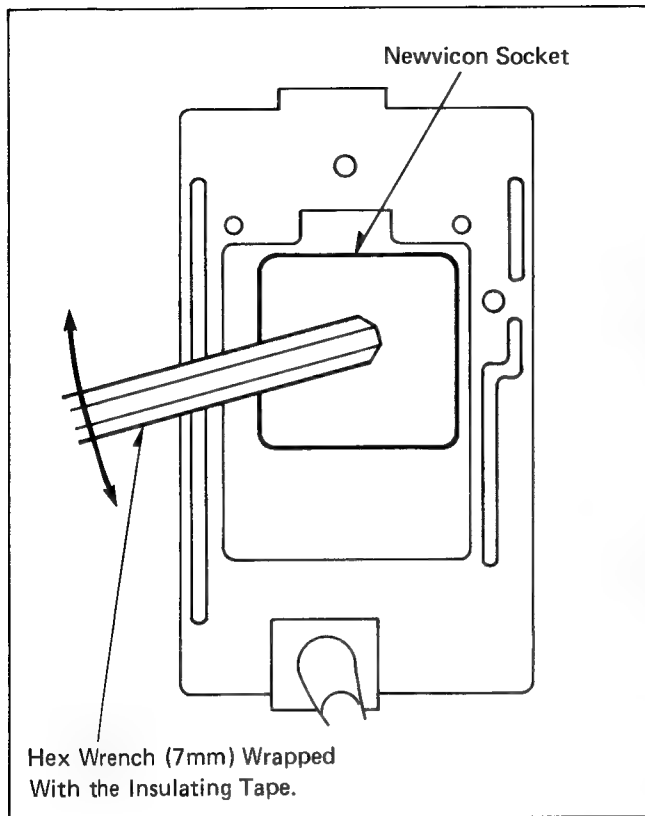


Fig. 20

Note:

Be careful not to touch the connector on the newvicon. The high voltage at the connector may give you a severe shock and perhaps damage the newvicon.

8. Finally, tighten the newvicon clamp screw. And put rear side circuit board back in the rear side, screw two screws.

(10) VERTICAL CENTERING AND VERTICAL SIZE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP302 5.0MHz Carrier	VR602 V. Size VR601 V. Cent	White	Scope	TP609 VSS

1. Aim the camera at a white chart.
2. Connect the oscilloscope to test point TP302 and observe the vertical interval of the 5.0MHz carrier signal. Trigger the oscilloscope with test point TP609.

3. Adjust the vertical size control, VR602, so that the beat in the signal is minimized. These beats will appear if the vertical size is not properly adjusted. Properly adjusted, there should be a maximum of one beat per envelope.

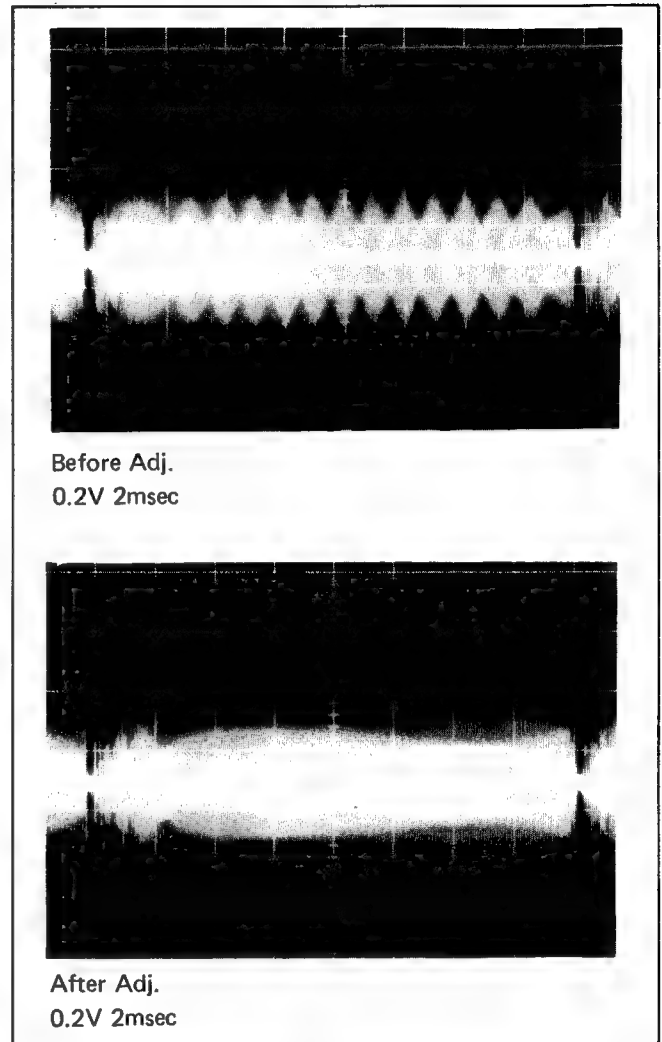


Fig. 21

4. Now aim the camera at a small object so that the object is in the center of the monitor screen.
5. Adjust the vertical center control, VR601, so that the small object does not shift vertically as you zoom in and out.

(11) HORIZONTAL LINEARITY AND SIZE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP302 5.0MHz Carrier Compsite Blanking	VR615 H. Size VR616 H. Lin. (1) L603 H. Lin. (2)	White	Scope FM Detector	TP610 HSS

1. Aim the camera at a white chart or white screen.
2. Check the focus adjustment and, if necessary, re-adjust Focus Control VR604.
3. Turn the FM detector knob to the Horizontal Size and Linearity position.
4. Turn the switch on the rear panel to the 5.0MHz position.

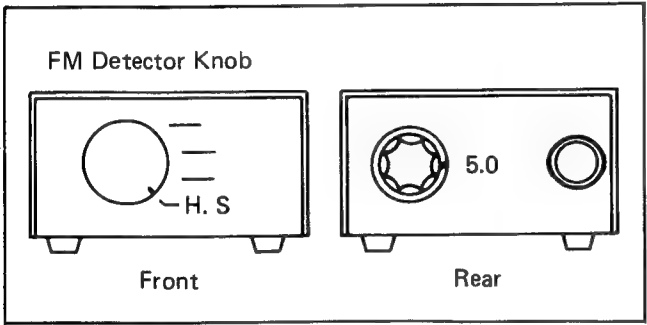


Fig. 22 FM Detector

5. Connect the FM detector input to test point TP302, and connect the FM detector output to the oscilloscope input. Connect the FM detector blanking to test point TP309. Connect the FM detector +9V line to test point TP605. Connect the FM detector ground to the camera ground.

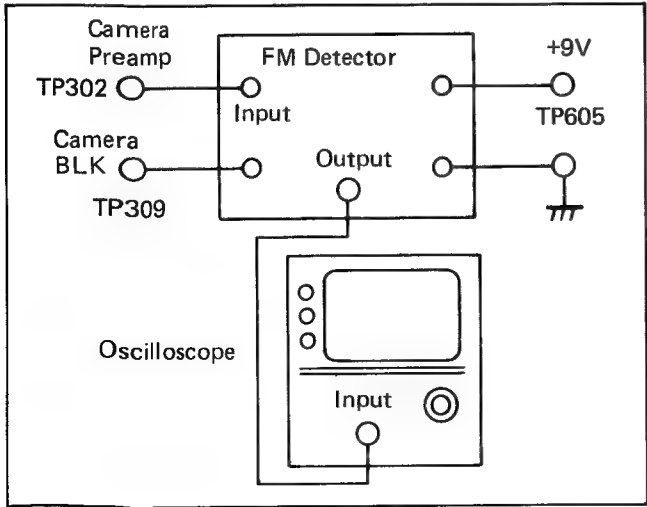


Fig. 23 Connection of FM Detector

6. Now, adjust the horizontal size control VR615, so that the signal is centered on the blanking line, as shown in Fig. 24.

Trigger the oscilloscope with test point TP610.

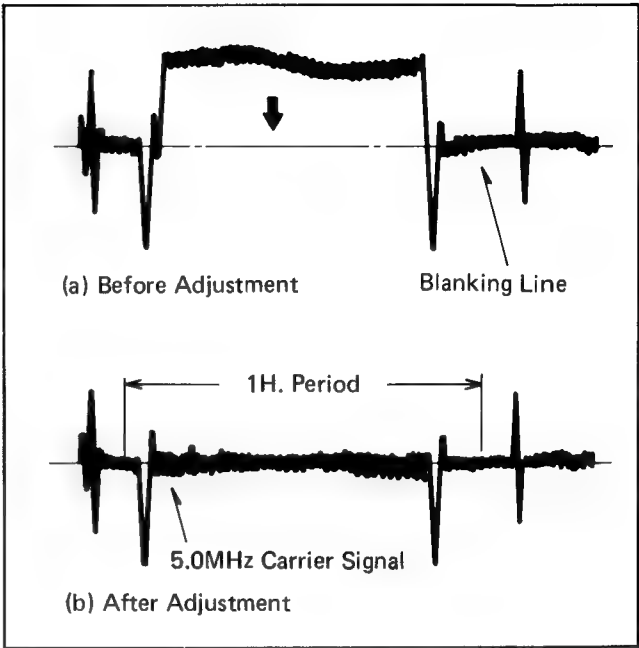


Fig. 24 Waveform of Proper Adjustment

7. Finally, adjust the horizontal linearity 1 control VR616, and the horizontal linearity 2 control, L603, so that the waveform on the oscilloscope is as flat as possible. Horizontal Linearity 1 controls the horizontal sweep for the left side of the picture, while Horizontal Linearity 2 controls the overall linearity.

(12) CONFIRMATION OF THE NEWVICON TURNING ADJUSTMENT

Check the newvicon turning adjustment and adjust it if necessary. If the adjustment is correct, go on to the next procedure, step (13).

(13) HORIZONTAL CENTERING ADJUSTMENT (Clamp Pulse Timing)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301 Preamp Output TP308 CP1	VR617 H. Cent.	White	Scope	TP610 HSS

1. Aim the camera at a white chart.
2. Next, connect an oscilloscope probe to test point TP301 and observe the horizontal blanking interval of the signal.
Trigger the oscilloscope with test point TP610.
3. Connect the other oscilloscope probe to the clamp pulse 1 (CP1) test point, TP308.
4. Set the oscilloscope in the delay mode.
5. Adjust the horizontal centering control, VR617, so that the time between the trailing edge of the video signal, in other words, the front porch of the optical black, and the leading edge of the clamp pulse 1 signal (TP308) is $1.5\mu\text{sec}$, as shown in Fig. 25.

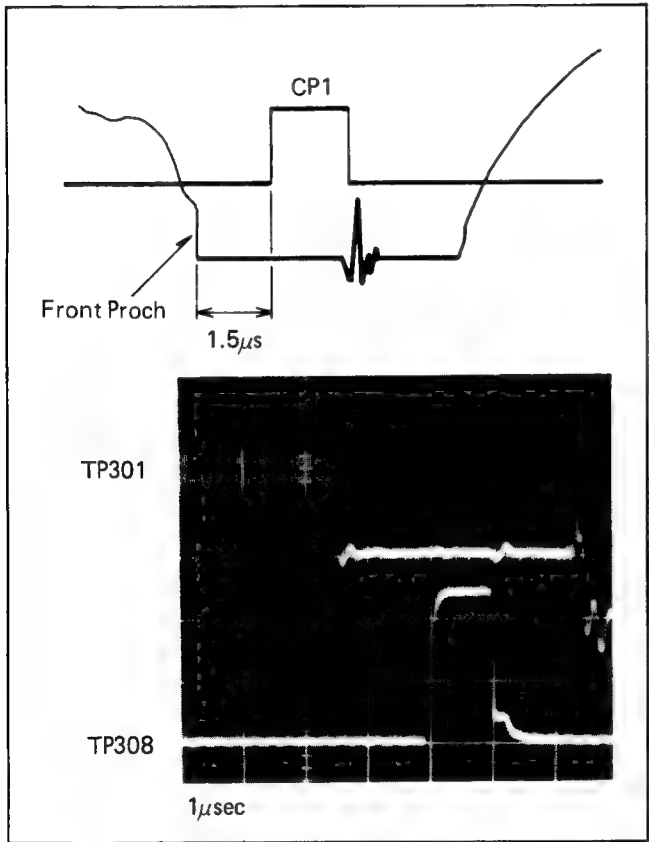


Fig. 25 Waveform for H. Cent.
(H. Blanking Signal at TP301 and CP1)

Note:

With some newvicons, the oscilloscope display will show a double trace at the end of a horizontal line. If this should occur, reconfirm the newvicon turning adjustment. If the newvicon adjustment is correct, adjust the horizontal centering control VR617 so that the time between the trailing edge (a) of the video signal and the leading edge of the clamp pulse 1 signal is $1.5\mu\text{sec}$.

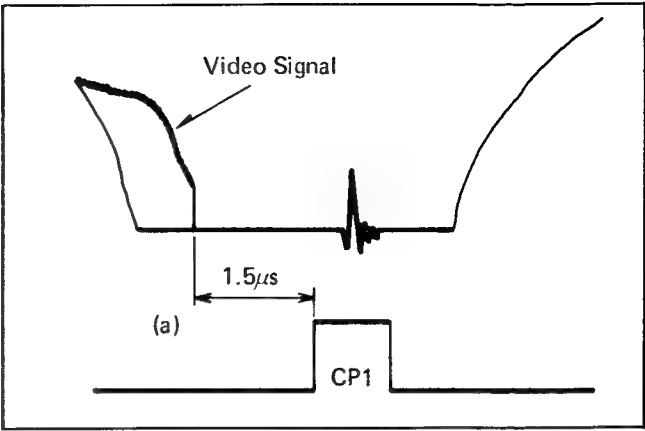


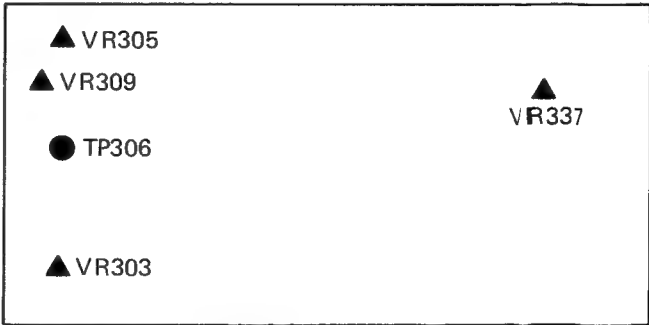
Fig. 26

(14) CONFIRM BEAM CURRENT ADJUSTMENT

If the target adjustment is made, check and readjust the beam current (step 1) if necessary.
If the adjustment is correct, go on to the next procedure, step (13).

(15) RED/BLUE SIGNAL SEPARATION ADJUSTMENT (COARSE)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP306 Blue Signal	VR305 VR309 VR303 VR337	Gray Scale White	Scope	TP610 HSS



PROCESS CIRCUIT BOARD

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to test point TP306 and observe the blue signal.
Trigger the oscilloscope with test point TP610.

- Alternately adjust the two red & blue separation controls, VR305 and VR309 to minimize the flicker.
- Aim the camera at a white chart.
- Then, alternately adjust VR303 and VR337, so that the white area in the monitor picture is maximized.

(16) BEAM ALIGNMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP316	Two Alignment Rings VR337 VR604	White	Color Monitor Scope	TP610 HSS

- Aim the camera at an evenly illuminated white surface (use 1,500 lux or light box) and focus the lens.
- Adjust VR337 so that the TV monitor picture is red-dish.
- And adjust the focus control VR604, so that the magenta area in the monitor picture is maximized and the green area is minimized.
- Cut the lock paint on the alignment rings before attempting to rotate the rings.

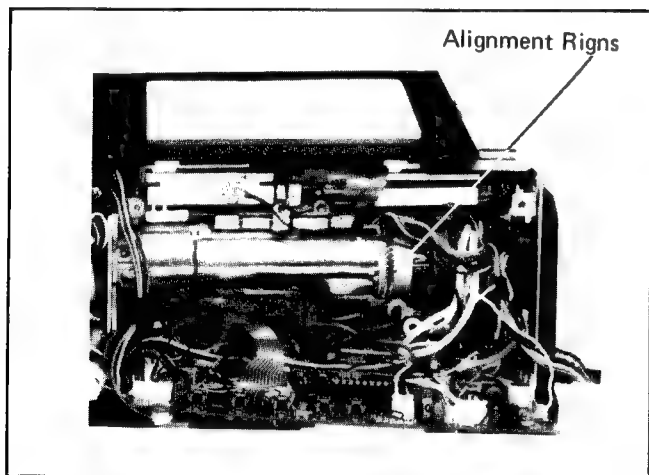


Fig. 27

- Connect the oscilloscope to test point TP316 and observe the R-Y signal at the horizontal rate. Trigger the oscilloscope with test point TP610.
- Observe the raster on the TV monitor, and adjust the two alignment rings (See Fig. 27.) so that the signal level is minimized and the magenta color covers the whole screen as shown in Fig. 28.

Note:

You may observe discoloration at the edges and corners.

Disregard this as the Dynamic Focus adjustment procedure will clean this up.

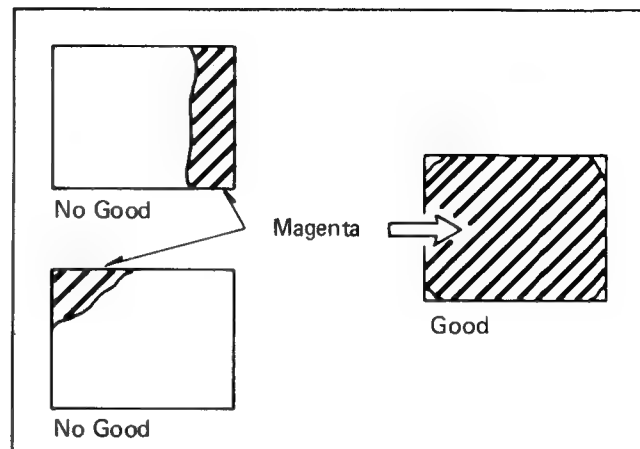


Fig. 28 TV Screen

- Paint-lock the alignment rings with either white paint or lacquer.

(17) CONFIRMATION OF SOME ADJUSTMENTS

Check some items as shown below.

- Vertical Centering and Vertical Size adjustment. (step 10)
- Horizontal Centering and Horizontal Size adjustment. (step 11.13)
- Dark Shading adjustment. (step 5)

(18) DYNAMIC FOCUS ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP316 R-Y Signal	VR611 H. Saw. VR612 H. Para. VR613 V. Para. VR614 V. Saw.	White	Scope Color Monitor	TP609 VSS TP610 HSS

- Aim the camera at a white chart.
- Observe the color monitor and adjust the focus control, VR604, so that the center area of monitor shows a red (magenta) color (minimize green color), if necessary.

3. Connect the oscilloscope to test point TP316 and observe the R-Y signal at the horizontal rate.
Trigger the oscilloscope with test point TP610.
4. Alternately adjust vertical parabola control, VR613 and vertical sawtooth control, VR614 so that the signal level is minimized as shown in Fig. 29.

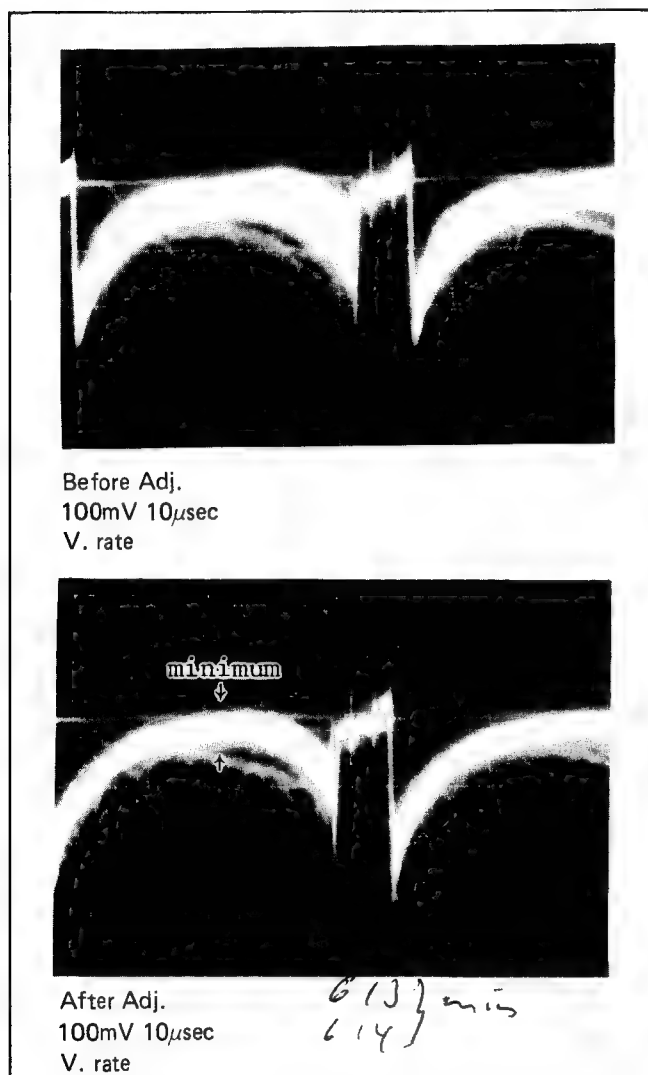


Fig. 29 Waveform of TP316

5. Then, alternately adjust horizontal sawtooth control, VR601 and horizontal parabola control, VR602 for the signal waveform to be flattest during the horizontal period as shown in Fig. 30.

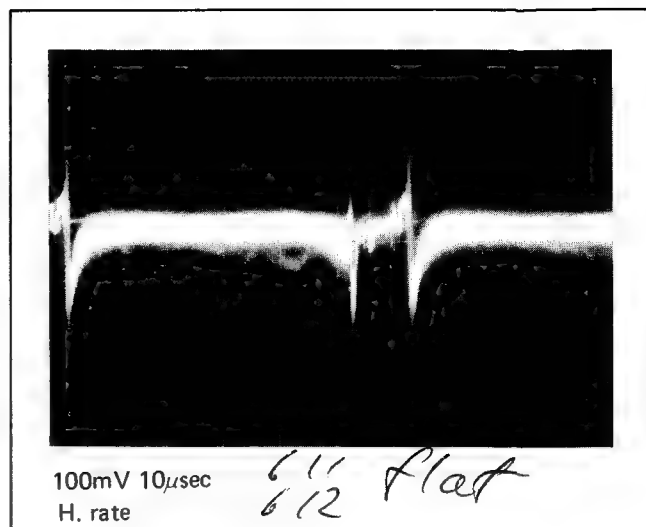


Fig. 30 Waveform of TP316

6. Check the color TV monitor for green tinting in the corners and at the sides. In most cases, the green tinting will be eliminated by these adjustments.
7. If, however, there is still some green tinting present, fine-adjust the alignment rings on the newvicon until the green tinting is completely eliminated.

(19) COLOR SHADING ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP316 R-Y Signal	VR314 VR315 VR316 VR317	White	Scope Color Monitor	TP610 HSS
TP317 B-Y Signal	VR310 VR311 VR312 VR313			

1. Aim the camera at a white chart of a light box.
If a reflection chart is used, a light intensity of about 4,000 lux will be required.
Next, confirm that the R/B color control knobs are set the center position.
2. Connect the oscilloscope to test point TP316 and observe the R-Y signal at the horizontal rate.
Trigger the oscilloscope with test point TP610.
3. Alternately adjust VR314 and VR315 so that the signal level is minimized as shown in Fig. 31.

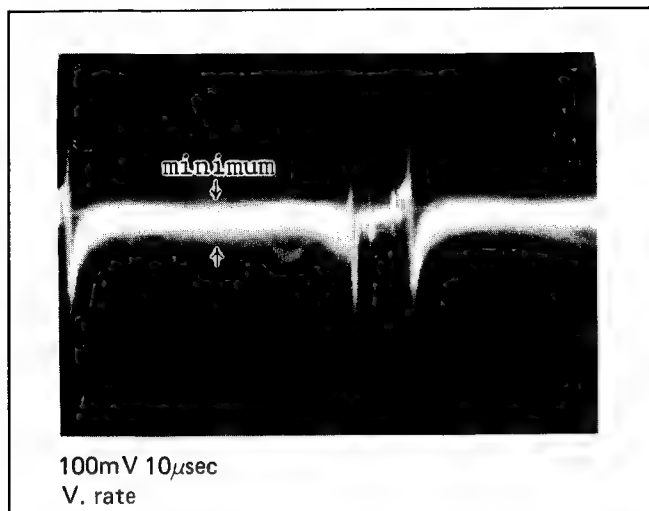


Fig. 31 Waveform of TP316

4. Then, alternately adjust VR316 and VR317 for the signal waveform to be flattest during the horizontal period as shown in Fig. 32.

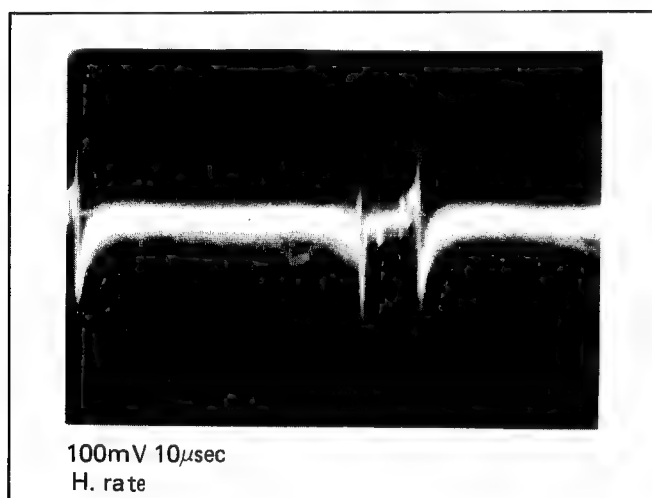


Fig. 32 Waveform of TP316

5. Now connect the oscilloscope to test point TP317 and observe the B-Y signal at the horizontal rate. Trigger the oscilloscope with test point TP610.
6. Alternately adjust VR310 and VR311 so that the signal level is minimized as shown in Fig. 33.

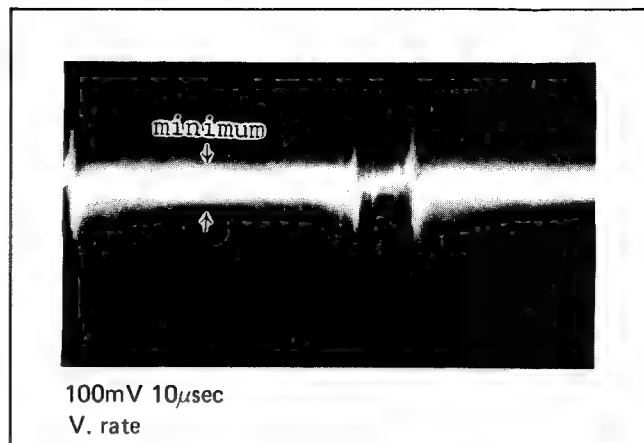


Fig. 33 Waveform of TP317

7. Then, alternately adjust VR312 and VR313 for the signal waveform to be flattest during the horizontal period, as shown in Fig. 34.

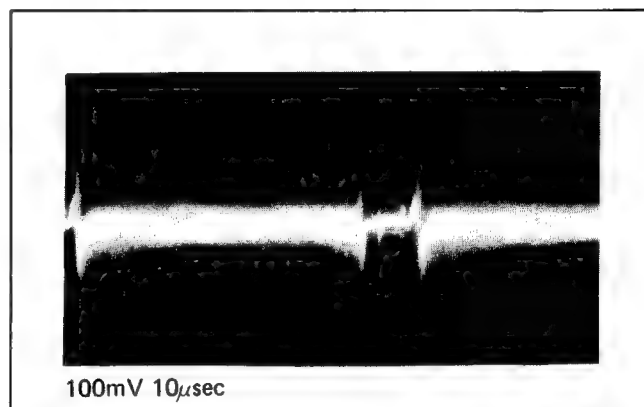
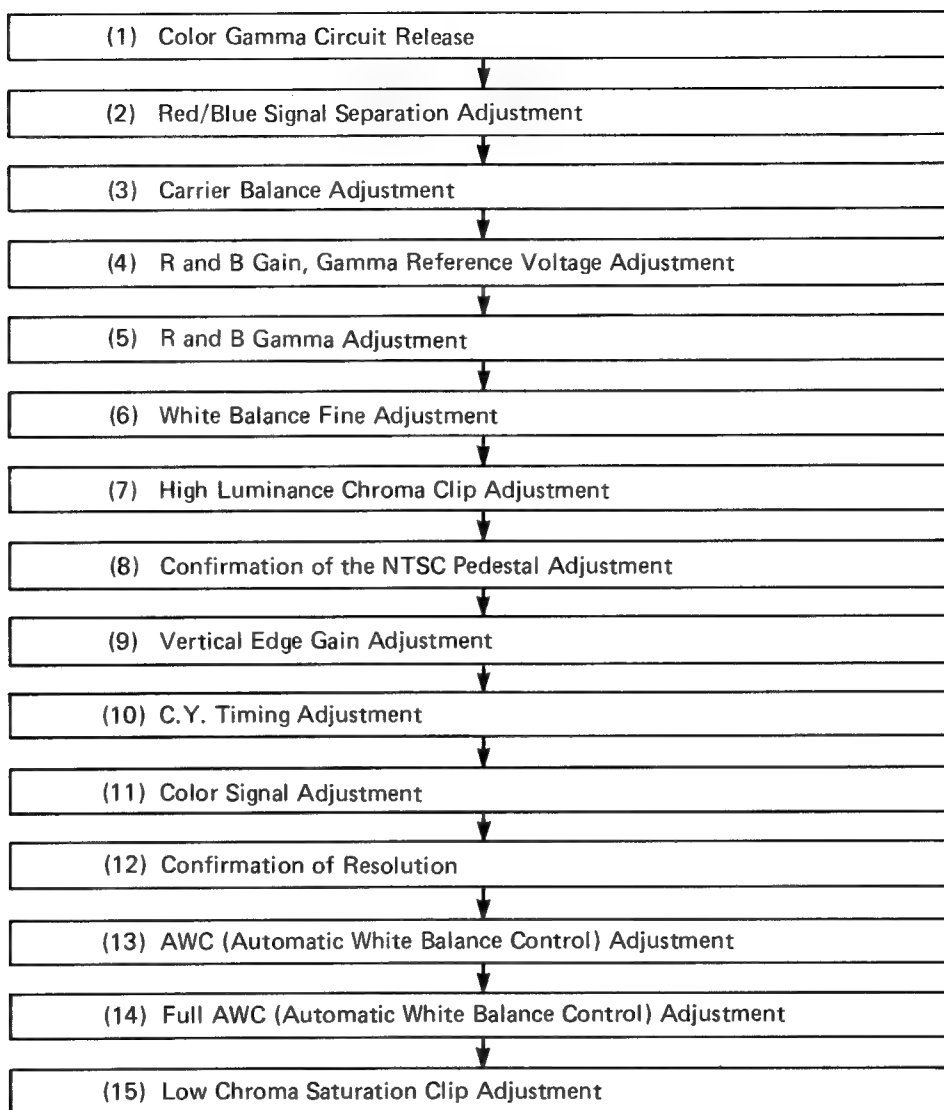


Fig. 34 Waveform of TP317

[3] PROCESS CIRCUIT ADJUSTMENT

ADJUSTMENT FLOW CHART FOR PROCESS CIRCUIT



Preparation:

The process circuit requires several preadjustments before any actual adjustments can be made.

1. Set the R and B color control knobs to the center, or detent position.
2. Next, set the iris control switch to the auto position.
3. Set the color temperature correction switch to the indoor position (mark: lamp).
4. Set the negative/positive reverse switch to the positive side.
5. Finally, set the standby switch to the operate position.

A test pattern light box will be required for several of the adjustment procedures.

Be sure that the AC voltage (115 ~ 125V) for the light box is correct and that you are using the correct pattern for each procedure.

If the reflection chart is used, the following light condition is required.

Color Temperature: 3200°K

Light Intensity: 1,400 ~ 2,000 lux
(on the chart surface)

Make sure that the correct pattern is used for each step.

(1) COLOR GAMMA CIRCUIT RELEASE

Turn VR328 counter clockwise and turn VR318, VR319, VR320, VR321, VR322, VR323, VR324 and VR325 to the center position as shown in Fig. 35.

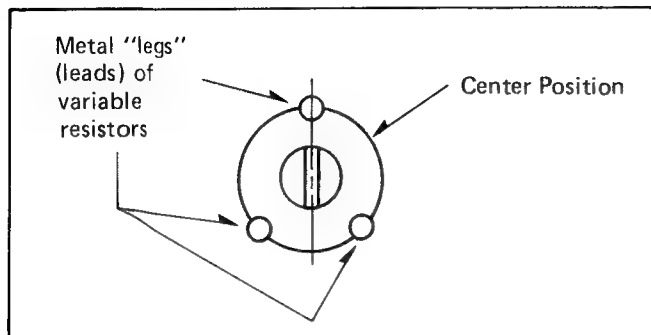


Fig. 35

Note:

Adjust each potentiometer from the foil side of circuit board.

(2) RED/BLUE SIGNAL SEPARATION ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP306 Blue Signal	VR305 VR309	Gray Scale	Scope	TP610 HSS

1. Set iris control to "Auto".
2. Aim the camera at the gray scale chart.
3. Connect the oscilloscope to test point TP306 and observe the blue signal.
Trigger the oscilloscope with test point TP610.
4. Alternately adjust the two red & blue separation controls, VR305 and VR309 to minimize the flicker.

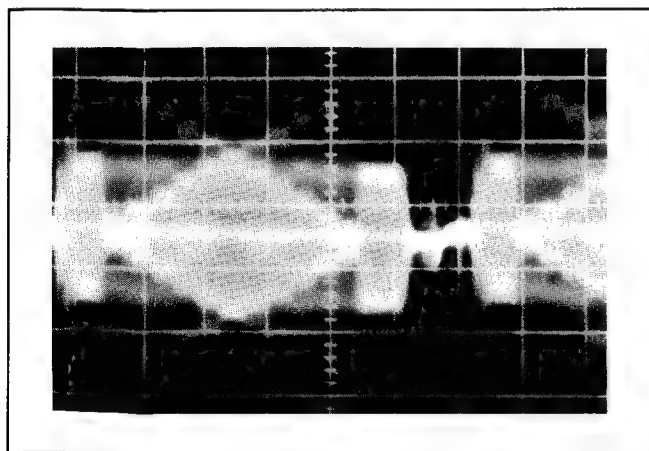


Fig. 36 Blue Signal

If the blue signal from test point TP306 has red contamination, the waveform will be unstable and have changing amplitude.

(3) CARRIER BALANCE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP318	VR326 VR327	Gray Scale	Vector Scope	TP610 HSS

1. Aim the camera at the gray scale chart.
2. Then, connect the vectorscope to test point TP318.
3. Alternately adjust the carrier balance controls, VR326 and VR327 so that the carrier balance point is in the center of the vector screen.

(4) R AND B GAIN, GAMMA REFERENCE VOLTAGE ADJUSTMENT (WHITE BALANCE ADJUSTMENT)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP318 NTSC Signal TP305	VR306 VR337 VR303	Gray Scale	Scope	TP610 HSS

Note:

Before proceeding with this adjustment, preset the following camera controls.

- a. Set the R and B color control knobs to the center, or detent position.
 - b. Set the iris control switch to the auto position.
 - c. Set the color temperature correction switch to the indoor position (lamp side).
1. Aim the camera at the gray scale chart.
 2. Connect the oscilloscope to the test point TP305 and observe the signal at the horizontal rate.
Trigger the oscilloscope with test point TP610.
 3. Adjust the gamma reference voltage control, VR306, so that the signal is clipped at the sixth step from the bottom as shown in Fig. 37.
 4. Set the AWB selector switch to the full auto position momentarily and return to the AWB position.
Then, confirm the view finder display so that AWB is flashing "PUSH".

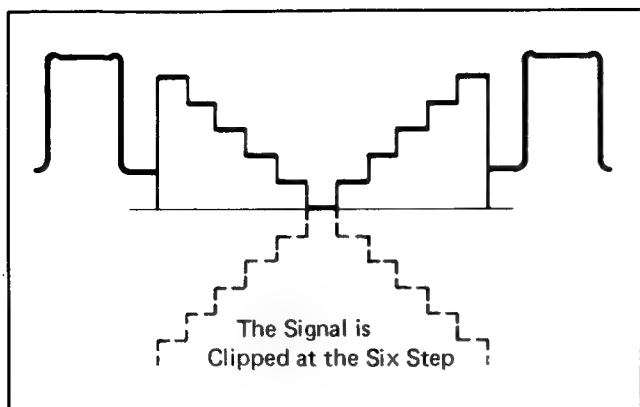


Fig. 37

5. Then, connect the oscilloscope to test point TP318 and observe the NTSC signal at the horizontal rate. Trigger the oscilloscope with test point TP610.
6. Alternately adjust the red gain control VR337, and the chroma gain control VR303, to minimize the carrier leakage at the fourth step through the eighth step from the bottom.

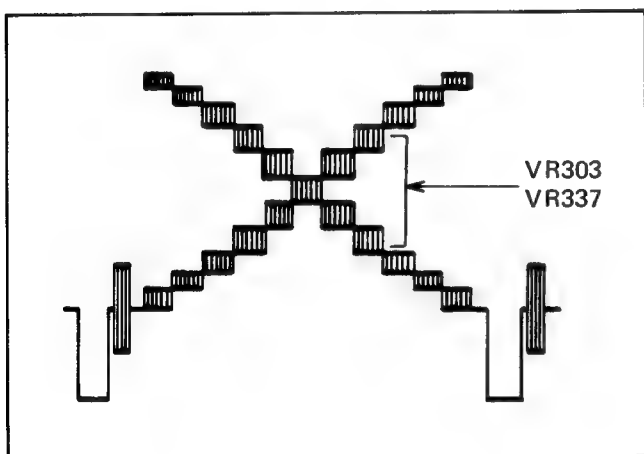


Fig. 38 NTSC Signal

(5) R AND B GAMMA ADJUSTMENT (WHITE BALANCE ADJUSTMENT)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP318 NTSC Signal	VR325 R-Gamma 1 VR321 B-Gamma 1 VR324 R-Gamma 2 VR320 B-Gamma 2 VR323 R-Gamma 3 VR319 B-Gamma 3 VR322 R-Gamma 4 VR318 B-Gamma 4	Gray Scale	Scope	TP610 HSS

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to test point TP318 and observe the NTSC signal at the horizontal rate. Trigger the oscilloscope with test point TP610.
3. Adjust Red Gamma 1 Control, VR325 and Blue Gamma 1 Control, VR321 until the carrier leakage from the bottom through third steps is minimized.
4. Alternately adjust the red gain control VR337, and the chroma gain control VR303, to minimize the carrier leakage at the fourth step through the eighth step from the bottom.
5. Adjust Red Gamma 2 Control VR324 and Blue Gamma 2 Control VR320 until the carrier leakage from third through fifth step from the top is minimized.
6. Then, adjust Red Gamma 3 Control VR316 and Blue Gamma 3 Control VR312, until the carrier leakage from the first through third step from the top is minimized.
7. Set the iris control switch to manual, and open the iris a little.
Adjust Red Gamma 4 Control VR322 and Blue Gamma 4 Control VR318, until the carrier leakage from the first through third step from top is minimized.

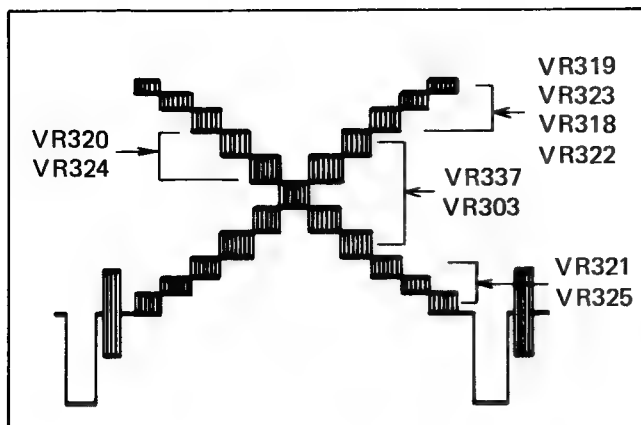


Fig. 39 NTSC Waveform

It is normal to have some residual carrier leakage, particularly at the top steps of the waveform.
It is normal condition that the level of minimized waveform is unstable depending on the characteristic of the newvicon.

(6) WHITE BALANCE FINE ADJUSTMENT

Repeat (4) R and B gain adjustment and (5) R and B gamma adjustment.

(7) HIGH LUMINANCE CHROMA CLIP ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR330 H. C. Gain	Gray Scale	Color Monitor	/

1. Aim the camera at the gray scale chart and observe the picture on the TV monitor.
2. Next, zoom out to 12mm and check the high luminance part of the scale, from the whitest step to the fourth step from white.
The picture should be whitish-gray.
3. If, however, the picture has a green or yellow cast, adjust the High Luminance Chroma Clip Gain Control VR330, until the cast is eliminated and the picture is a normal whitish-gray.

High Luminance Parts Should Show no Color When Adjustment by VR330.

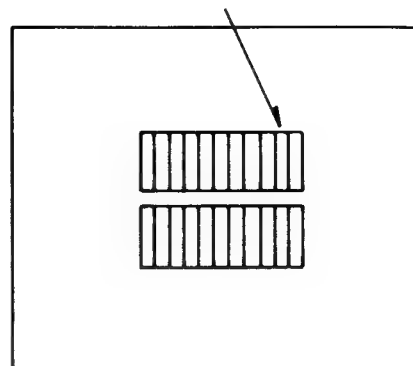


Fig. 40

(8) CONFIRMATION OF THE NTSC PEDESTAL ADJUSTMENT

Check NTSC pedestal adjustment and NTSC signal level adjustment, step (7) (See deflection circuit adjustment flow chart.), and adjust it if necessary.

If the adjustment is correct, go on to the next step.

(9) VERTICAL EDGE GAIN ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR333 V. Edge Gain	Gray Scale	Color Monitor	/

1. Aim the camera at the gray scale chart.
2. Observe the picture on the monitor and adjust Vertical Edge Gain Control VR333 until the color fringing on the upper and lower edges of the gray scale is eliminated.

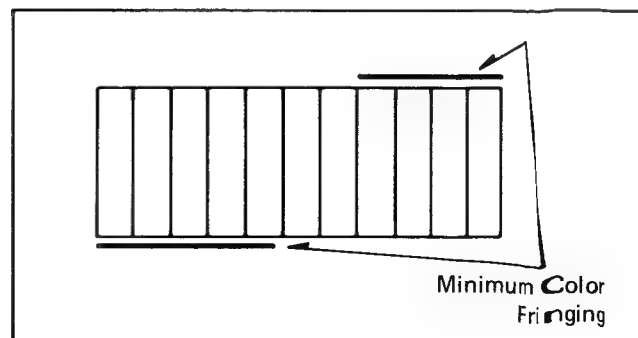


Fig. 41 Picture of Gray-Scale

(10) C. Y TIMING ADJUSTMENT

1. Aim the camera at the gray scale chart.
2. Observe the picture on the monitor and adjust VR307 until the color fringing on the right and left of the gray scale is eliminated.

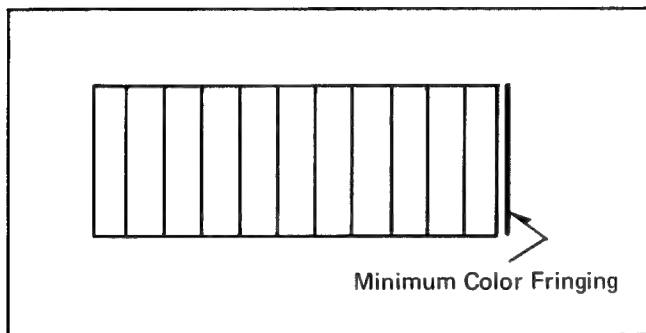


Fig. 42 Picture of Gray-Scale

(11) COLOR SIGNAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP318 NTSC Signal	VR308 Color Gain VR329 R-Y Gain VR331 BF Phase C348 B-Y Phase	Color Bar Chart	Vectorscope	/

Note:

Before beginning this adjustment, check to see that the AWB of view minder display grows "OK".
If it doesn't, adjust white Balance Control until it grows "OK".

1. Aim the camera at the color bar chart.
2. Connect the vectorscope to test point TP318.
3. Set the vectorscope to "Vector" mode and observe the color vector.
4. Adjust the color gain control VR308, so that the amplitude of the YL signal is 1.2 times the amplitude of the burst signal.
5. Adjust the R-Y gain control VR329, so that the amplitude of the red signal is 1.5 times the amplitude of the burst signal.
6. Adjust the burst flag phase control VR331, (BF Phase), so that the vector phase of the red signal is $104^{\circ} (+15^{\circ}, -15^{\circ})$.

7. Adjust the B-Y phase control C348 so that YL signal is $168^{\circ} (+10^{\circ}, -30^{\circ})$.
8. Adjust the total amplitude and the total phase with VR308, VR329, VR331 and C348 to be within specification as shown in chart-1.
9. Turn the negative/positive reverse switch to the negative side, and check the color signal.

Specification:

1) Phase

Signal	Vector Phase	Adj.
R	$104^{\circ} \pm 15^{\circ}$	VR331
YL	$168^{\circ} +10^{\circ} -30^{\circ}$	C348

2) Amplitude

- a. The amplitude of R signal is 1.5 times the burst signal.
- b. The amplitude of YL signal is 1.2 times the burst signal.

Chart-1.

(12) CONFIRMATION OF RESOLUTION

1. Shoot the Resolution Chart.
Frame it completely.
2. While viewing the Resolution Chart on the EVF confirm that the horizontal resolution is approximately 300 lines.

(13) AWC (AUTOMATIC WHITE BALANCE CONTROL) ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP318 NTSC Signal	VR335 VR336	White	Vectorscope	/

1. Aim the camera at a white chart.
2. Set the AWB selector switch to the full auto position momentarily and return to the AWB position.
3. Confirm the view minder display so that AWB is flashing "PUSH".

4. Connect the vectorscope to test point TP318, and then set the vectorscope to the "Vector" mode.
5. Then, press the WB button.
6. Observe the vectorscope screen, and alternately adjust the automatic white balance controls VR335, VR336 so that the white balance point is in the center of the vectorscope screen.
7. Then, press the WB button, check the view minder display so that AWB grows "OK".
8. Set the color temperature correction switch to the outdoor position (mark: sun) and press the WB button.
9. Confirm the view minder display so that AWB grows "BLUE" or "RED" (3200°K).

(14) FULL AUTOMATIC WHITE BALANCE CONTROL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP318 NTSC Signal	VR339 VR340	White	Vectorscope	/

1. Set the AWB selector switch to the full auto position.
2. Aim the camera at a white chart.
3. Connect the vectorscope to test point TP318 and set the vectorscope to the "Vector" mode.
4. Then, alternately adjust VR339 and VR340 so that the white balance point is in the center of the vectorscope screen.

(15) LOW CHROMA SATURATION CLIP ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP310	VR328	Gray Scale	Scope	TP610 HSS

1. Aim the camera at the gray scale chart.
2. Adjust the white balance by R and B controls.
3. Connect the oscilloscope to test point TP310 and observe the signal at the horizontal rate.
Trigger the oscilloscope with test point TP610.
4. Adjust VR328 until the clipped line appears on the waveform as shown in Fig. 43.

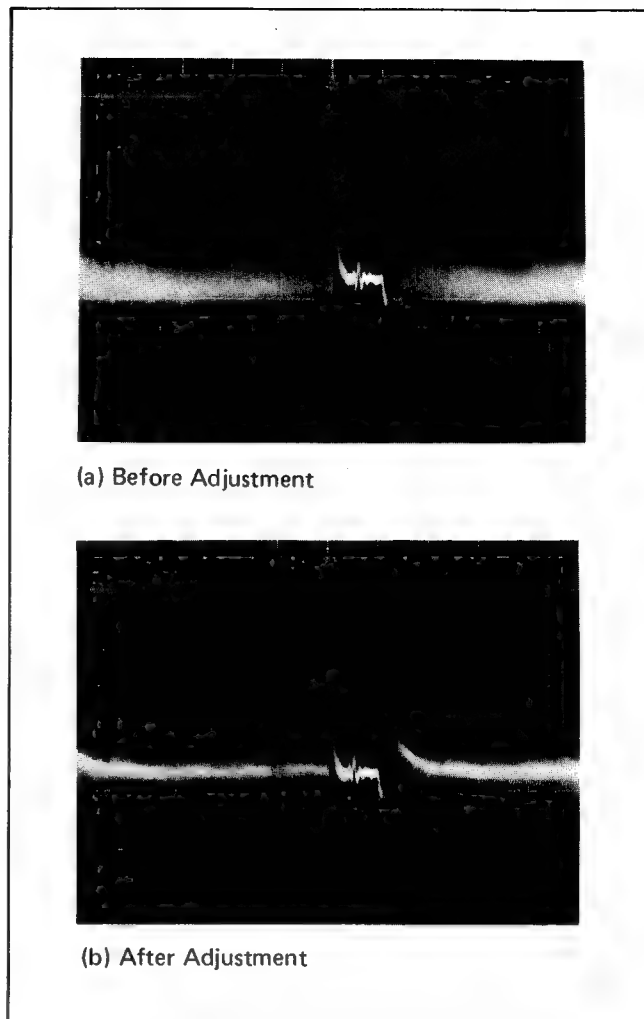


Fig. 43

5. Aim the camera at a normal object, and confirm that the low chroma saturation clip is correct.

[4] ELECTRONIC VIEWFINDER CIRCUIT

Preparation:

Connect the viewfinder connector to the EVF connector on the camera head.

(1) H-OSC ADJUSTMENT

1. Turn the power switch on.
2. Aim the camera at the test pattern.
3. Short pin-1 and pin-2 of connector P607 using a jumper.

4. Connect the oscilloscope to pin-19 of IC603 and measure the voltage (V1) of pin-19.
5. Then, disconnect the jumper and adjust VR618 so that the oscilloscope indicates $V1 + 1.0 (-0, +0.1) V$.

(2) FOCUS

1. Aim the camera at the registration chart.
2. If the focus on viewfinder is improper but the picture on the monitor is OK, adjust VR903.

(3) HORIZONTAL AND VERTICAL CENTERING ADJUSTMENT

1. Aim the camera at the registration chart.
2. Adjust the centering coil assembly so that the horizontal and vertical picture is proper condition.

(4) HORIZONTAL AMPLITUDE ADJUSTMENT

1. Aim the camera at the gray scale chart.
2. Adjust the horizontal amplitude control L904 so that the picture on the EVF is same as picture on TV monitor.

(5) VERTICAL AMPLITUDE ADJUSTMENT

1. Aim the camera at the gray scale chart.
2. Adjust the vertical amplitude control VR620 as shown in Fig. 44.

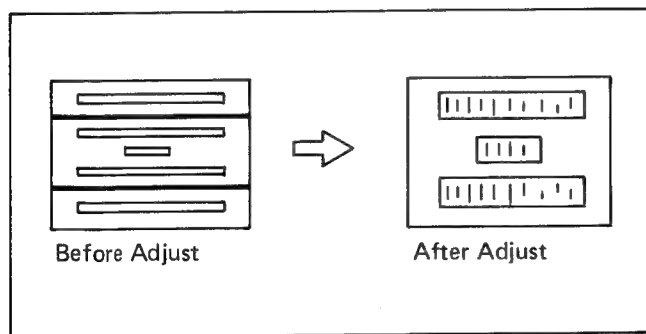


Fig. 44

(6) IRIS INDICATOR ADJUSTMENT

1. Aim the camera at the gray scale chart.
If a reflection type gray scale chart is used, a light intensity above 1,000 lux will be required on the chart surface.
2. Set the iris control switch to auto.
3. Adjust VR619 so that the iris indicator is in the center position.

(7) BRIGHT ADJUSTMENT

1. Aim the camera at the gray scale chart.
2. Adjust VR902 so that the picture on the EVF is proper condition.

[5] CAMERA REMOTE CONTROL CIRCUIT

(1) SYSTEM CLOCK ADJUSTMENT

1. Connect the frequency counter probe to TP702.
2. Adjust VR701 so that the frequency counter indicates $255KHz \pm 5KHz$.
3. Connect the frequency counter probe to TP612.
4. Adjust VR621 so that the frequency counter indicates $250KHz \pm 10KHz$.

(2) CRYSTAL OSCILLATION FREQUENCY ADJUSTMENT

1. Connect the frequency counter probe to TP701.
2. Adjust C703 so that the frequency counter indicates $32.768KHz \pm 1KHz$.

(3) DISPLAY POSITION ADJUSTMENT

1. Connect the camera with VCR (FP, FQ, FE series).
2. Turn the power switch on.
Set the VCR/CAMERA switch to the CAMERA position.
3. Adjust VR6002 (on the A.V.R C.B.A) so that the characters (except VCR information) are displayed as shown below. (a=b)

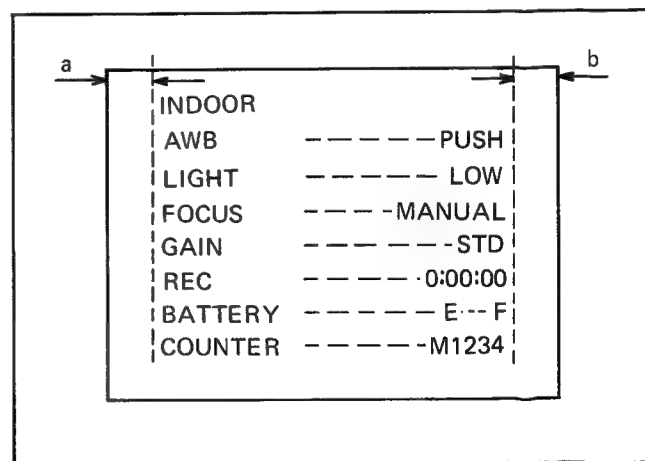


Fig. 45 E.V.F

4. Then, adjust VR702 so that the characters (VCR information) are displayed as shown below.

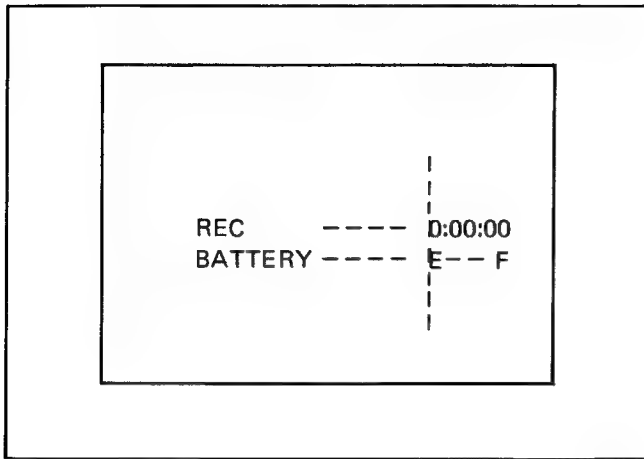


Fig. 46 VCR Information Display

Auto Focus Servicing Tools List

Auto Focus Jigs SetVFKW0006
Precision Driver.VFKW0006A
Diffusion Cap.VFKW0006B
Infrared Ray Detect CameraVFKW0006C
Auto Focus Lens Adjustment DriverVFKW0006D
Infrared Ray Position Chart (Ⅱ)VFKW0008
Gray Chart.VFKW0009

Auto Focus Lens Adjustment Procedures

(1) Removal of Auto Focus Lens Side Covers

1. Move the shoulder slide to the rear.
Then, press the portion (A) and move the shoulder slide to the rear as shown in Fig. 1-A.
Unscrew 2 screws (B) (see Fig. 1-B).

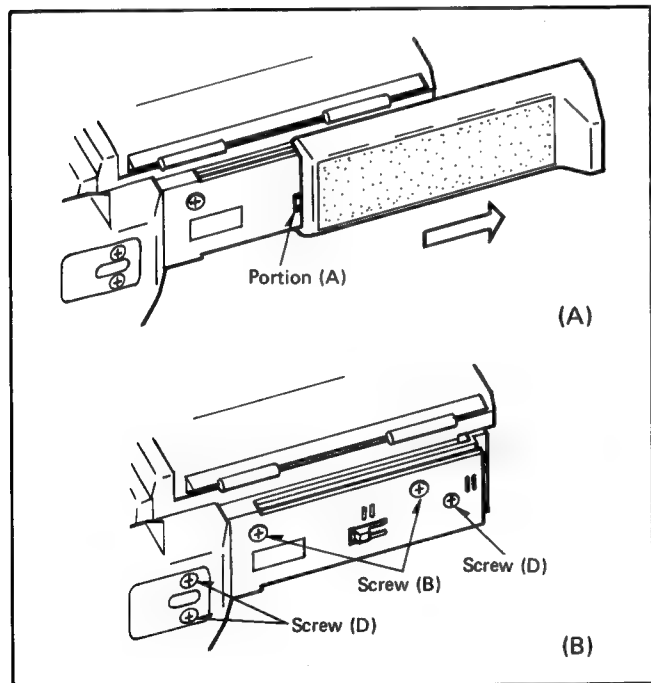


Fig. 1

2. Then, unscrew 2 screws (rear side) and remove the left and right side covers. (refer to section "Disassembly Method").
3. Unscrew 2 screws (C) (see Fig. 2-A/B).

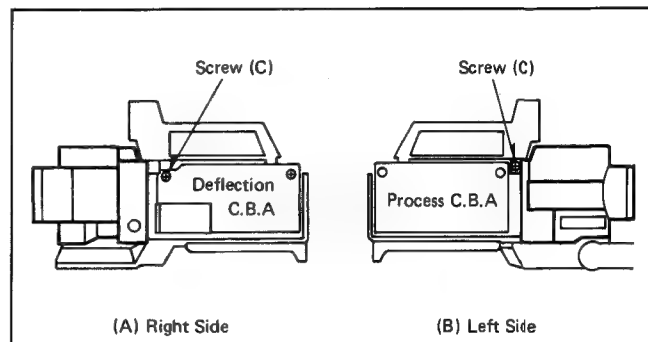


Fig. 2-(A), (B)

4. Unscrew 3 screws (D) and remove the shoulder assembly from the camera head (see Fig. 1-B).
5. Unscrew 6 screws and remove both AF side covers (refer to section "Replacement of the Power Zoom Lens").

(2) Infrared Light Emitting Diode (IR-LED) Position Adjustment

Note: We recommend that infrared light emitting diode position adjustment is performed in the dark room.

1. Set the camera and the infrared ray position chart as follows.

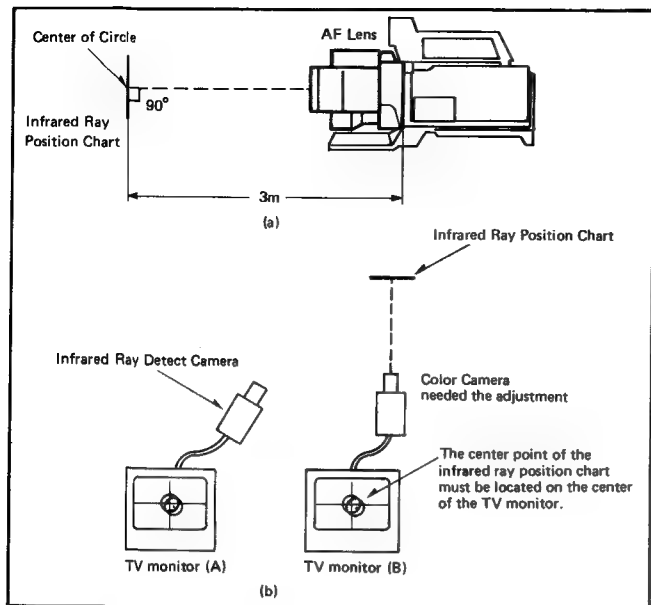


Fig. 3 Color Camera Setting Condition

2. Aim the camera at the infrared ray position chart and observe the picture on the TV monitor (B). The center point of the infrared ray position chart must be located on the center of the TV monitor screen.
3. Then, aim the infrared rays detect camera at the infrared ray position chart and observe the picture on the TV monitor (A).
4. And adjust the LED horizontal position and LED vertical position so that the infrared ray is hit the circle ($\phi 110$) as shown in fig. 1-(b), TV monitor (A). (Irradiated position is less than the circle ($\phi 110$)).

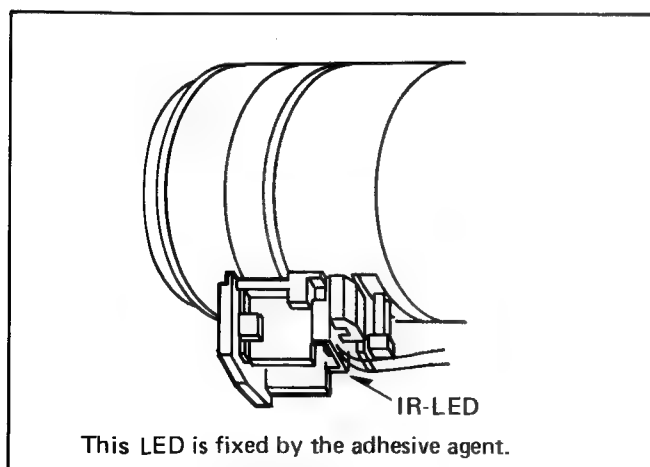


Fig. 4 LED Position Adjustment

(3) Offset Adjustment

1. Remove the A.F Cover (A) and (B) (refer to section "Removal of Auto Focus Lens Side Covers").

2. Connect the read wire to pin 9, 10, 11, 16, 32 of HIC6552 on Auto Focus (A) Circuit Board. (Refer to Fig. 5.)

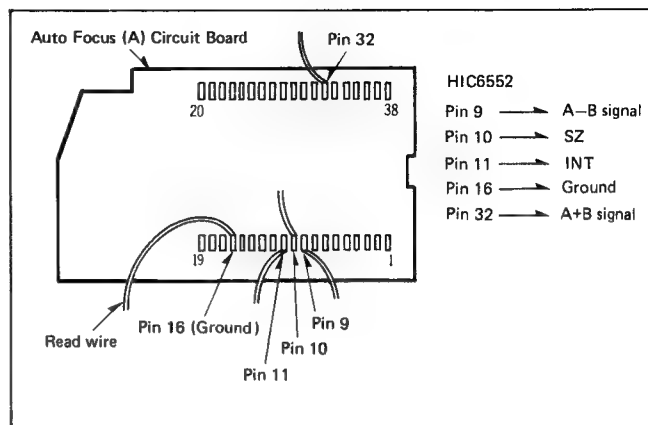


Fig. 5 Auto Focus (A) Circuit Board

3. Cover the distance detection window (receiver side) with the thick black paper as shown in Fig. 6.

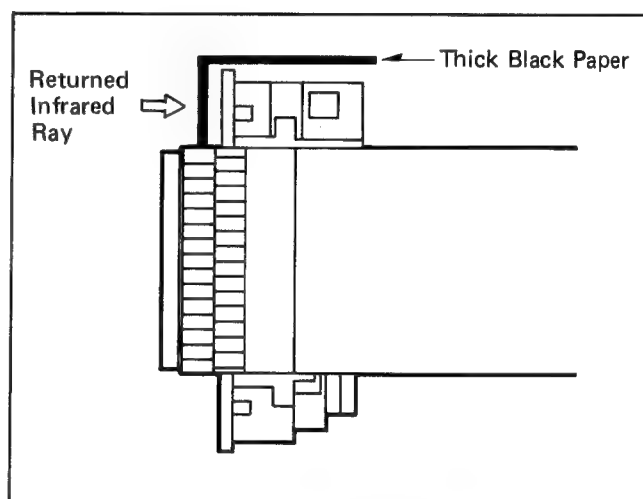


Fig. 6 Covering Method

4. Connect a jumper between pin 11 of HIC6552 and ground (pin 16 of HIC6552), trigger the oscilloscope with pin 10 of HIC6552 (SZ), connect the oscilloscope with pin 32 of HIC6552 (A+B signal) and pin 9 of HIC6552 (A-B signal) and observe the waveform.
5. Then, adjust VR5102 (A+B signal offset adjustment) so that the waveform level is $2.7V \pm 50mVp-p$, adjust VR5103 (A-B signal offset adjustment) so that the waveform level is $2.7V \pm 20mVp-p$ as shown in Fig. 7.

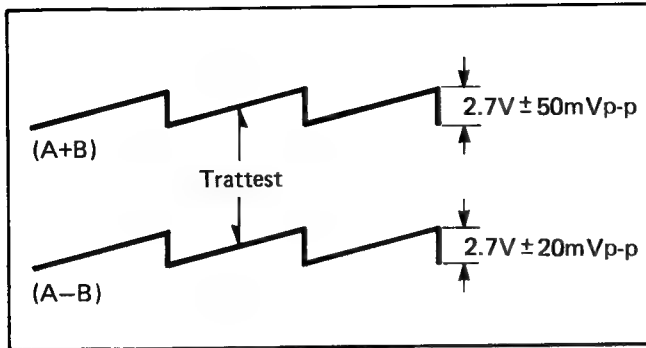


Fig. 7 A+B, A-B signal waveform

(4) Silicon Photodiode (SPD) Vertical Position Adjustment

1. Remove the Auto Focus Cover.
2. Directly connect pin 11 of HIC6552 to the ground (pin 16 of HIC6552).
3. Aim the camera at the gray chart (VFKW0009) as shown in Fig. 8.

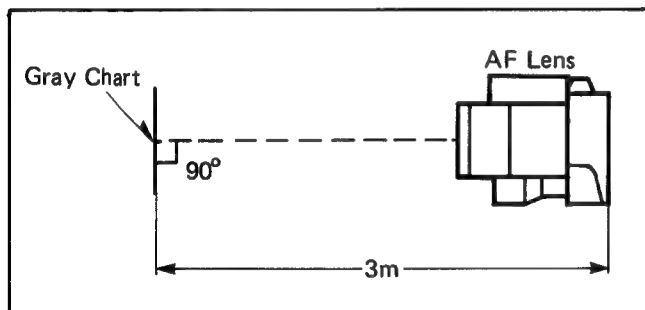


Fig. 8

4. Confirm the focus ring indicates the 3 meter. If the focus ring doesn't indicate 3 meter, adjust the SPD vertical position adjustment screw as shown in Fig. 9. (Preadjustment)

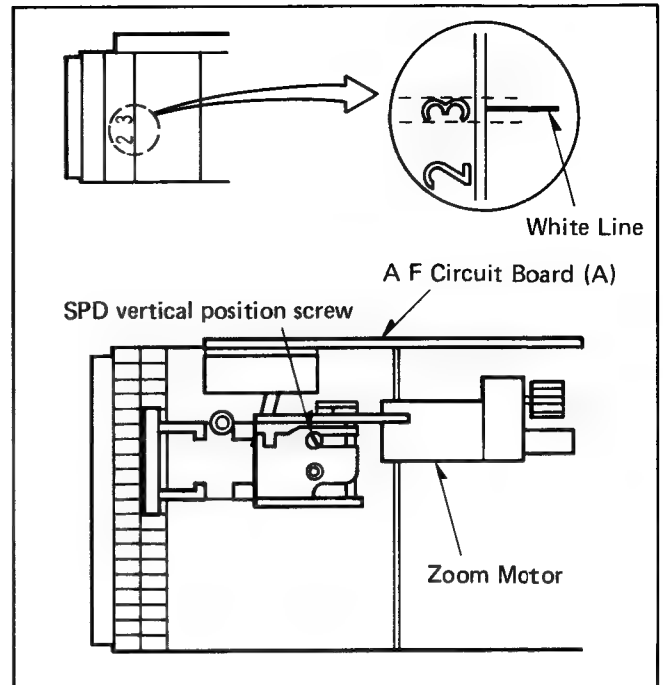


Fig. 9 SPD Vertical Position Adjustment

5. Connect the oscilloscope with pin 32 of HIC6552 (A+ B signal).
Trigger the oscilloscope with pin 10 of HIC6552 (SZ).
6. Adjust the VR5104, so that the priode (A) on the waveform is minimized as shown in Fig. 10.

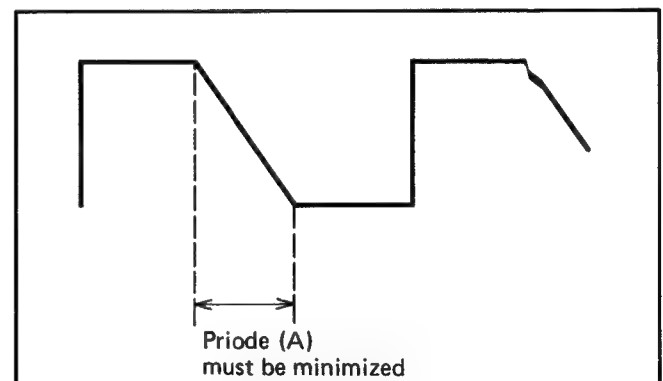


Fig. 10

(5) Confirmation of Offset Adjustment

Check the offset adjustment and adjust it if necessary.

(6) Silicon Photodiode (SPD) Horizontal Position Adjustment

1. Remove the side covers.
2. Connect the pin 11 of HIC6552 to the ground (pin 16 of HIC6552).
3. Aim the camera at the Gray Chart.

4. Then, adjust the SPD vertical position adjustment screw so that the focus ring indicates the 3 meter position, return back to the 3 meter position from the infinity side and near side as shown in Fig. 9.
5. Connect the oscilloscope to pin 32 of HIC6552, trigger the oscilloscope with pin 10 of HIC6552 and observe the waveform.

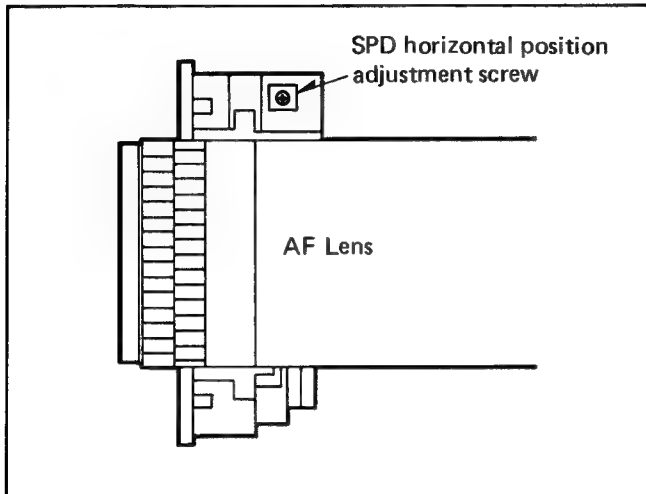


Fig. 11

6. Adjust the SPD horizontal position adjustment screw so that the priode (A) on the waveform is minimized as shown in Fig. 12.

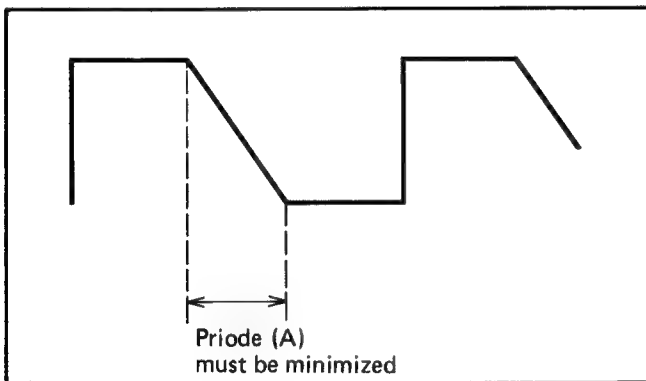


Fig. 12 The waveform of HIC6552 Pin 32

7. Fix the horizontal position adjustment screw by the adhesive agent.

(7) Hunting Adjustment

1. Remove the side cover.
2. Set the camera and the infrared ray position chart as shown in Fig. 3.
3. Disconnect the read wire between pin 11 of HIC6552 and pin 16.

4. Confirmation:

If the focus ring is fully turned to both infinity and near sides by hand and released the hand, the focus ring must indicate the 3 meter position $\pm 1\text{mm}$ as shown below. If the focus ring doesn't indicate, properly adjust VR5104.

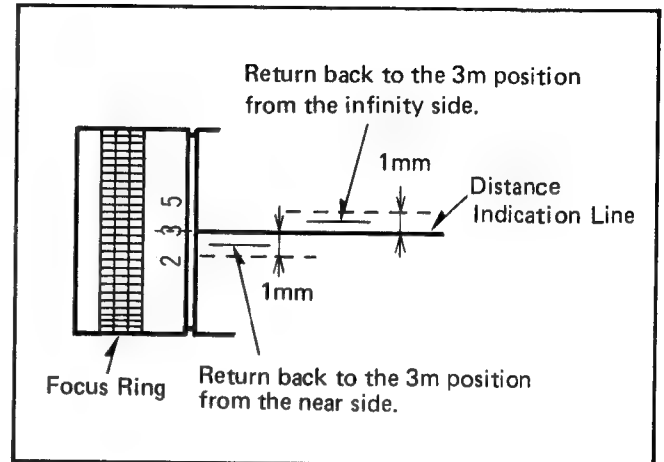


Fig. 13 Hunting Adjustment

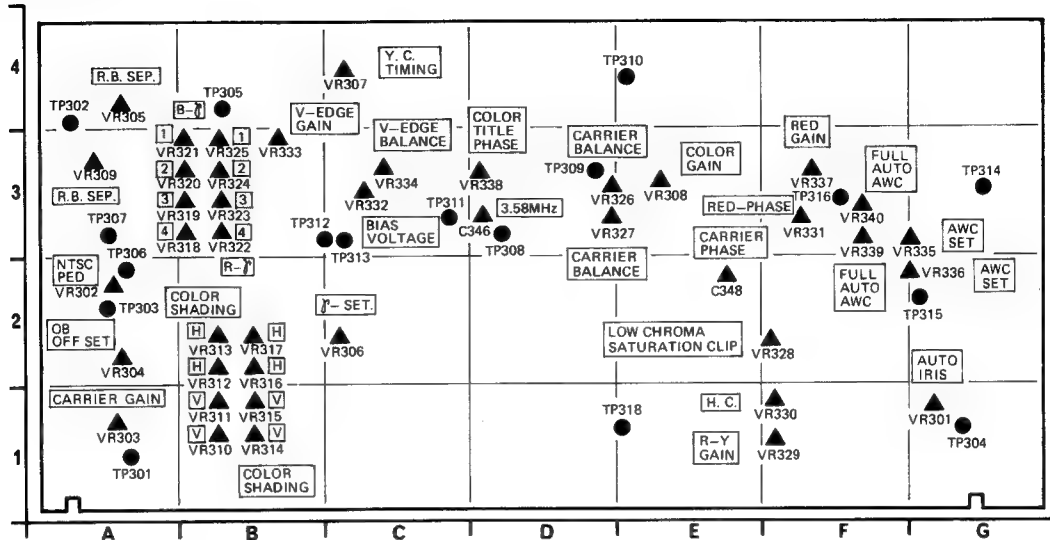
5. If hunting doesn't stop, adjust the VR5101.

Clockwise → D.B. width extend
Counterclockwise → D.B. width narrow

Location of Test Points and Controls

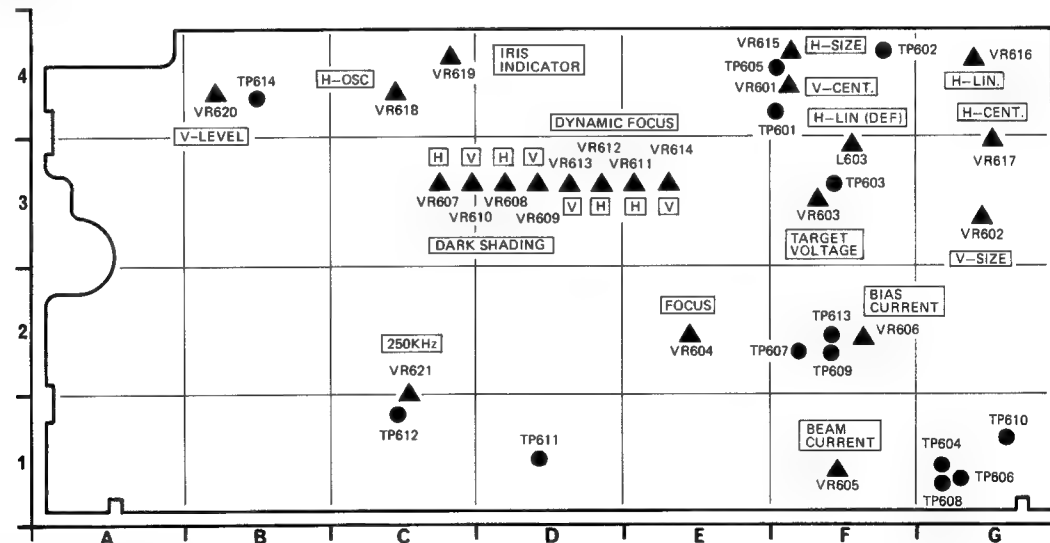
Process C.B.A. (Left side of the camera when viewed from the front.)

VEPW0256



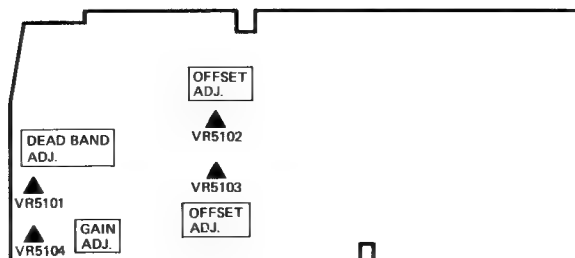
Deflection C.B.A. (Right side of the Camera when viewed from the front.)

VEPW0257



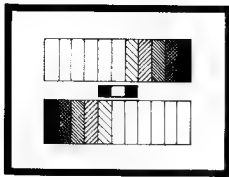
Auto Focus (A) C.B.A.

VEPW0361

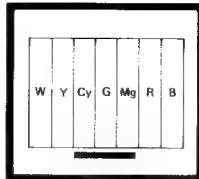


COLOR CAMERA SERVICING FIXTURES

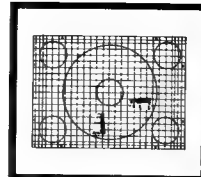
VFKS002 LIGHT BOX W/CHART SET



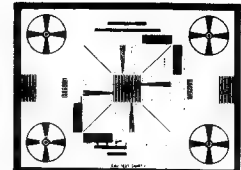
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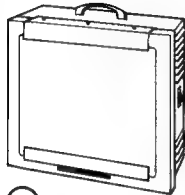
②



③



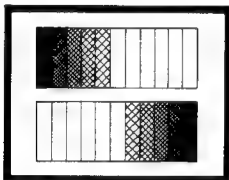
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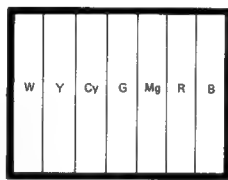
⑤

- ① VFKS002A Gray Scale Chart
- ② VFKS002B Color Chart
- ③ VFKS002C Registration Chart
- ④ VFKS002D Resolution Chart
- ⑤ VFKS002Y Light Box

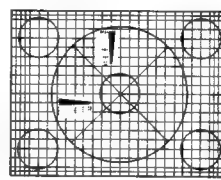
VFKS003 REFLECTION CHART SET



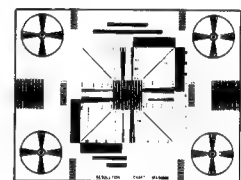
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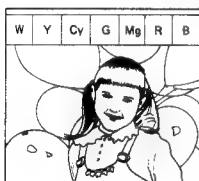
②



③



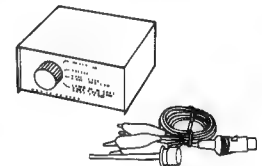
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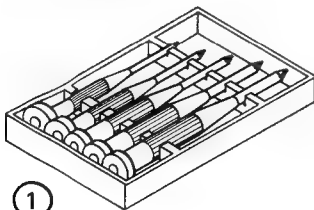
⑤

- ① VFKS003A Gray Scale Chart
- ② VFKS003B Color Chart
- ③ VFKS003C Registration Chart
- ④ VFKS003D Resolution Chart
- ⑤ VFKS003E Color Sheet

VFKS001C FM DETECTOR



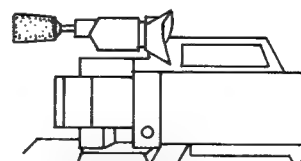
VFKW0006 AUTO FOCUS JIGS SET



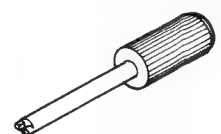
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②

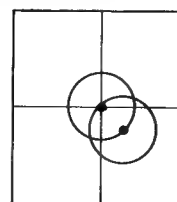


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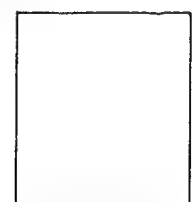


④

- ① VFKW0006A Precision Driver
- ② VFKW0006B Diffusion Cap
- ③ VFKW0006C Infrared Ray Detect Camera
- ④ VFKW0006D Adjustment Driver



VFKW0008
Infrared Ray Position Chart(II)



VFKW0009
Gray Chart

Panasonic®
MATSUSHITA ELECTRIC

Service Manual

Color Video Camera

PK-958

Vol. 3

Block Diagrams



PK-958

SPECIFICATIONS

Power Source: DC 12V \pm 10%
AC 120V \pm 10%, 60Hz \pm 0.5%
(with Power Supply Unit)

Power Consumption: DC 6.6W at 12V DC (Battery)
(with E.V.F.) (6W with Auto Focus off)
DC 2.0W at standby

Newvicon Tube
System: 2/3" frequency separation single tube system (built in stripe filter)

Single Carrier
Frequency: 5MHz

Focus System: Electro-static type

Lens Mounting: Built in zoom lens (not "C" mount)

Lens: 8:1 zoom lens with auto/manual iris control
Power zoom lens (2 speed) and macro construction
F: 1.4, f: 11mm ~ 88mm
d: 1.0m to infinity

Lens Diameter: 58mm

Light Sensitivity: Minimum light intensity on optical image: 7 lux (F: 1.4)
Optimum light intensity on optical image: 900 lux

Video Output Level: 1.0Vp-p, 75 Ω (Standard NTSC signal)

Sync. System: Internal Sync.: RS-170

Signal to Noise Ratio: More than 45dB

Horizontal Resolution: 300 lines

Color Temperature

Control: 2 step switch (indoor/outdoor) & Auto adjust

Microphone: Stereo microphone
Audio Output Level: -20dB, Hi-impedance
Audio Output

Impedance: High impedance (1 K Ω)

External Microphone

Input Impedance: 600 Ω unbalanced

(Left, Right)

Electronic Viewfinder: Monochrome 1 inch CRT
Operating

Temperature: 5°C to 40°C

Operating Humidity: 10% to 75%

Operating Position: Nomal position and Gain up position

Weight: Camera Head with E.V.F.
5.5 lbs (with lens, 7 ft cable & shoulder pad/handle grip)
AC adaptor (option)
2.4 lbs

Dimensions:

Camera Head with E.V.F.
8.4"(W) \times 7.7"(H) \times 16.4"(D)
210mm(W) \times 192mm(H) \times 409mm(D)
AC adaptor (option)
3"(W) \times 3"(H) \times 6"(D)
79mm(W) \times 75mm(H) \times 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

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Division of Matsushita Electric
Corporation of America
One Panasonic Way, Secaucus,
New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhū St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

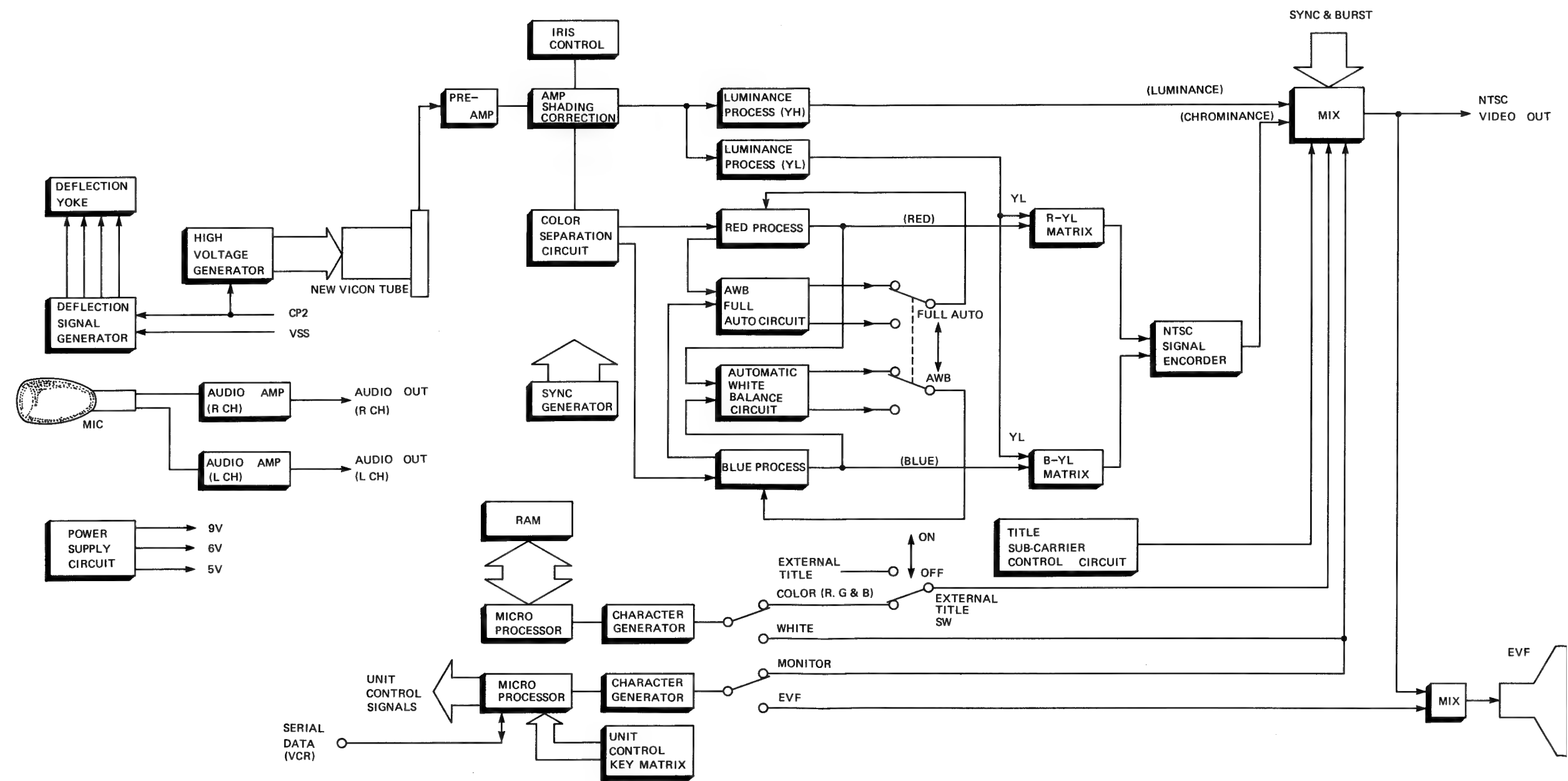
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Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
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Victoria Industrial Park
Carolina, Puerto Rico 00630

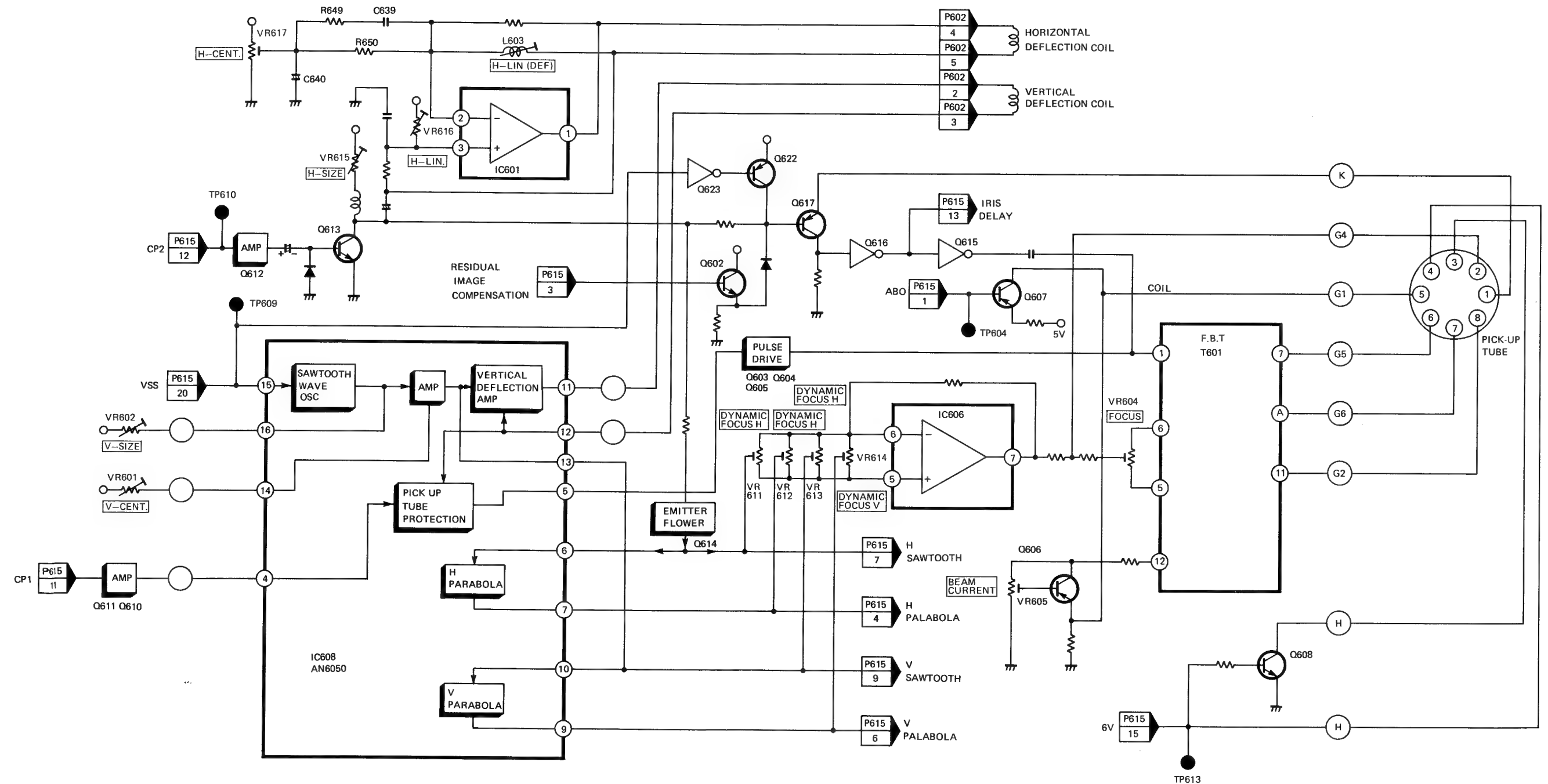
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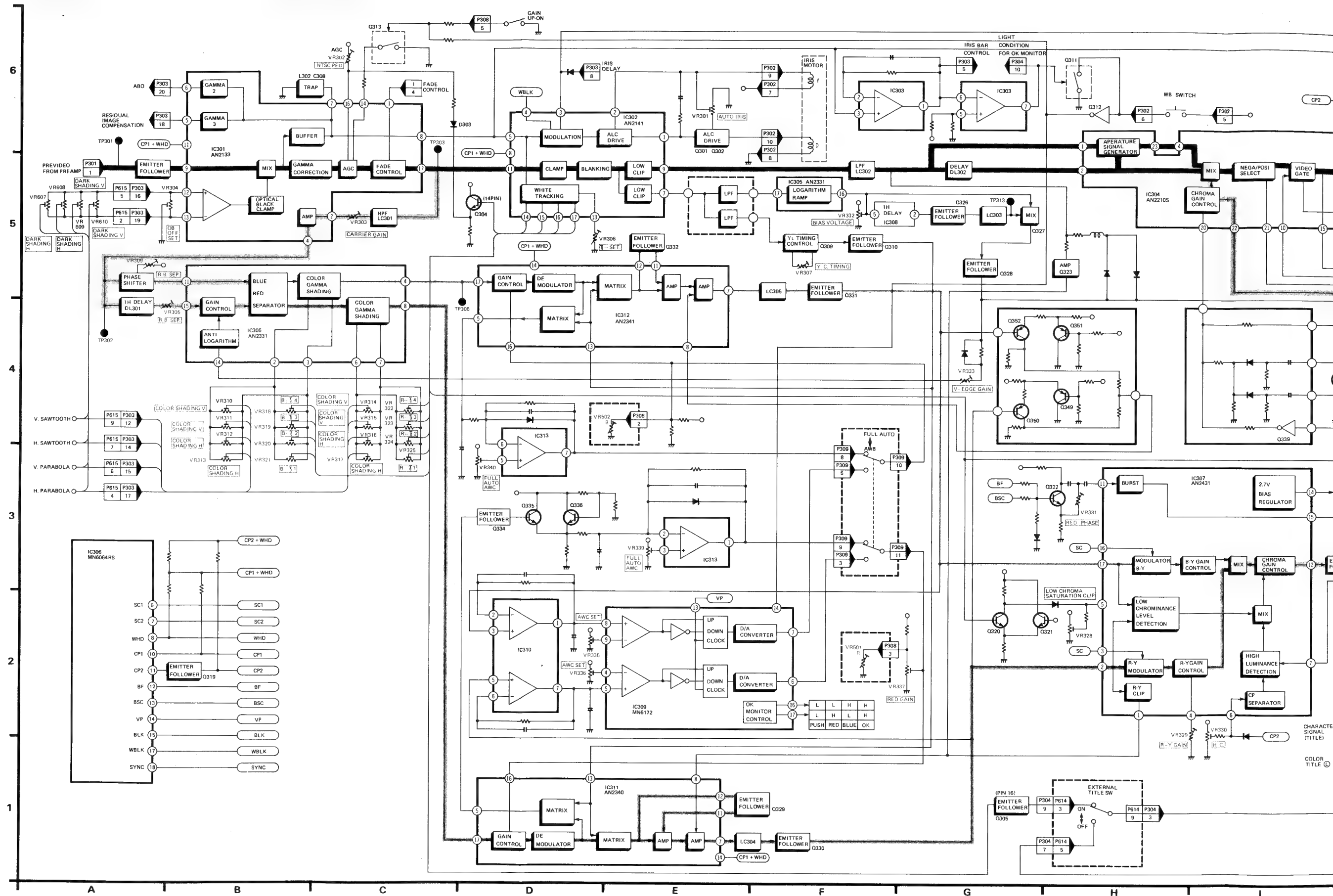
OVERALL BLOCK DIAGRAM



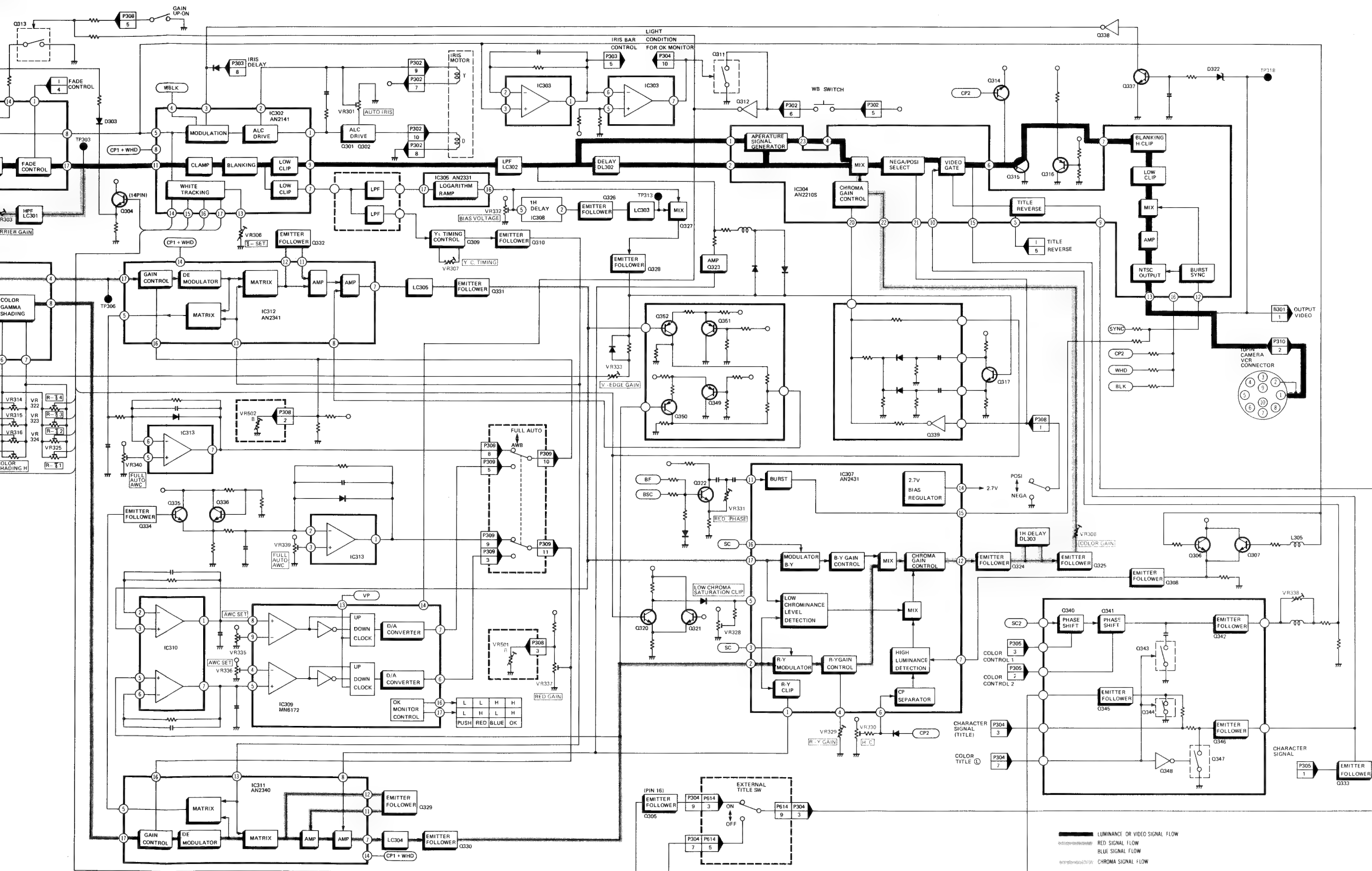
DEFLECTION BLOCK DIAGRAM



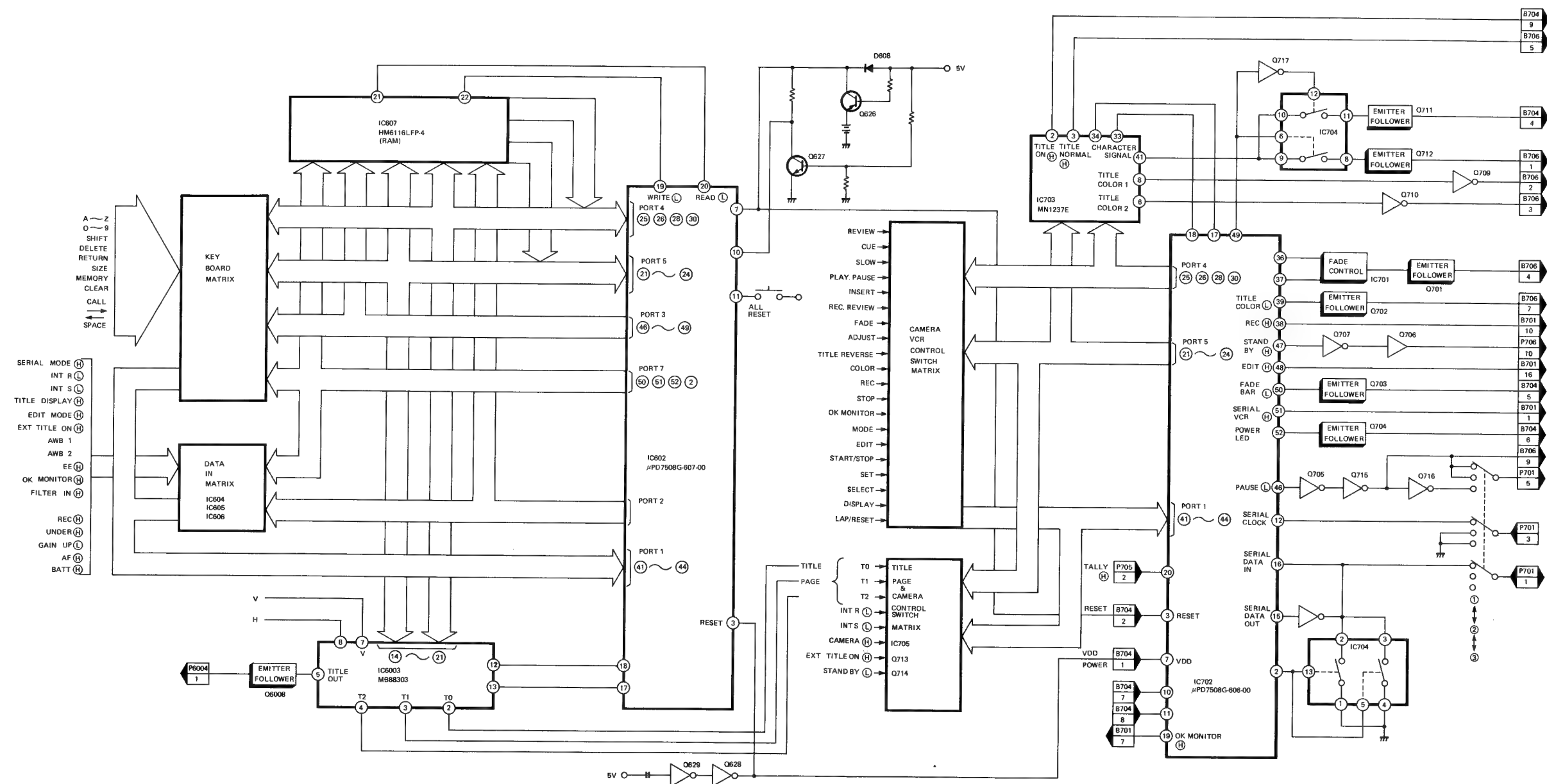
PROCESS BLOCK DIAGRAM



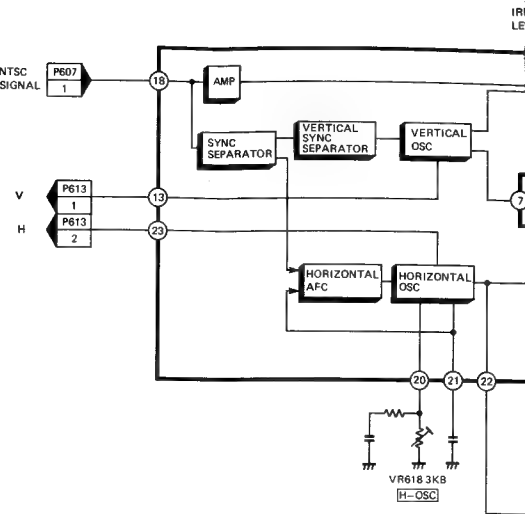
M



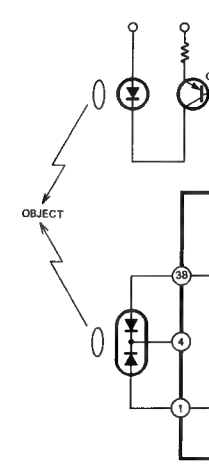
MICRO PROCESSOR BLOCK DIAGRAM



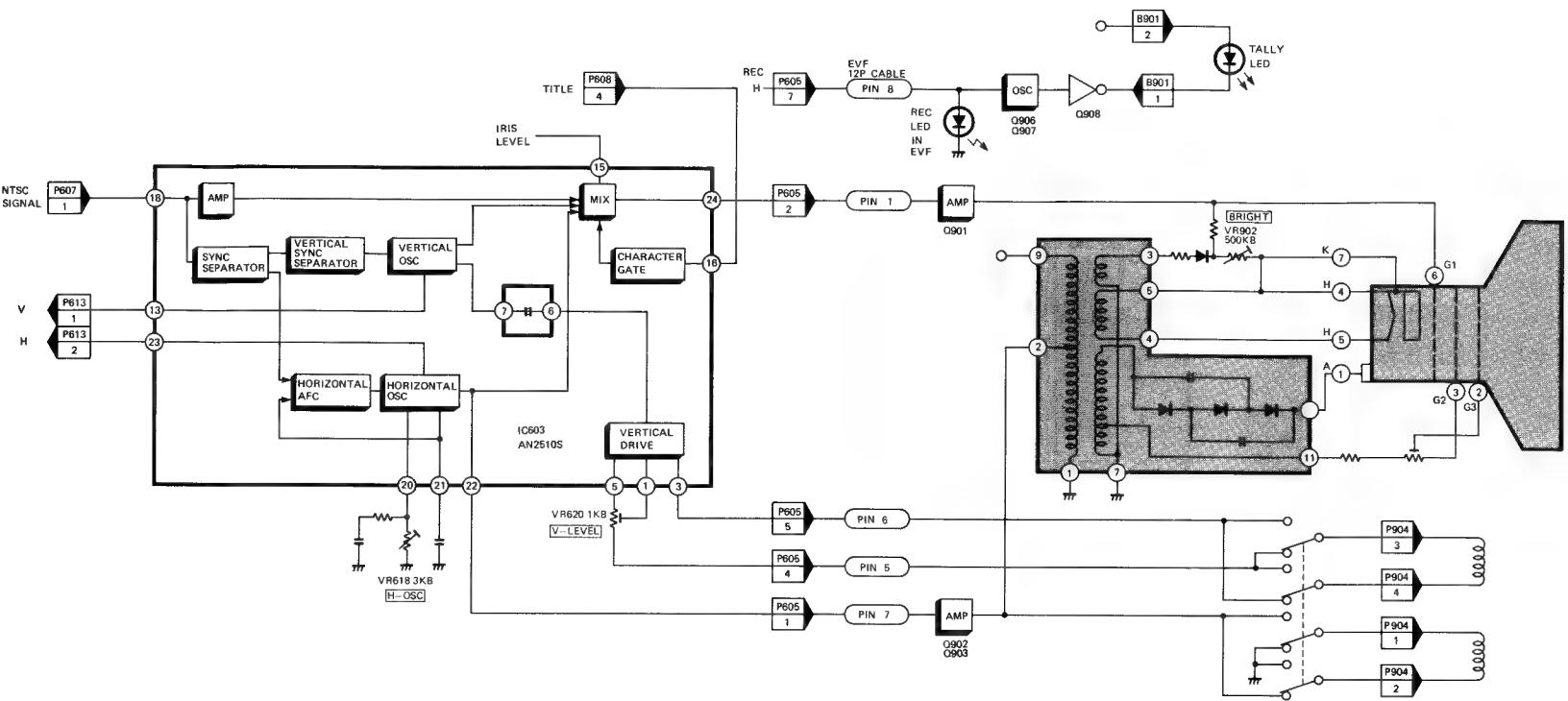
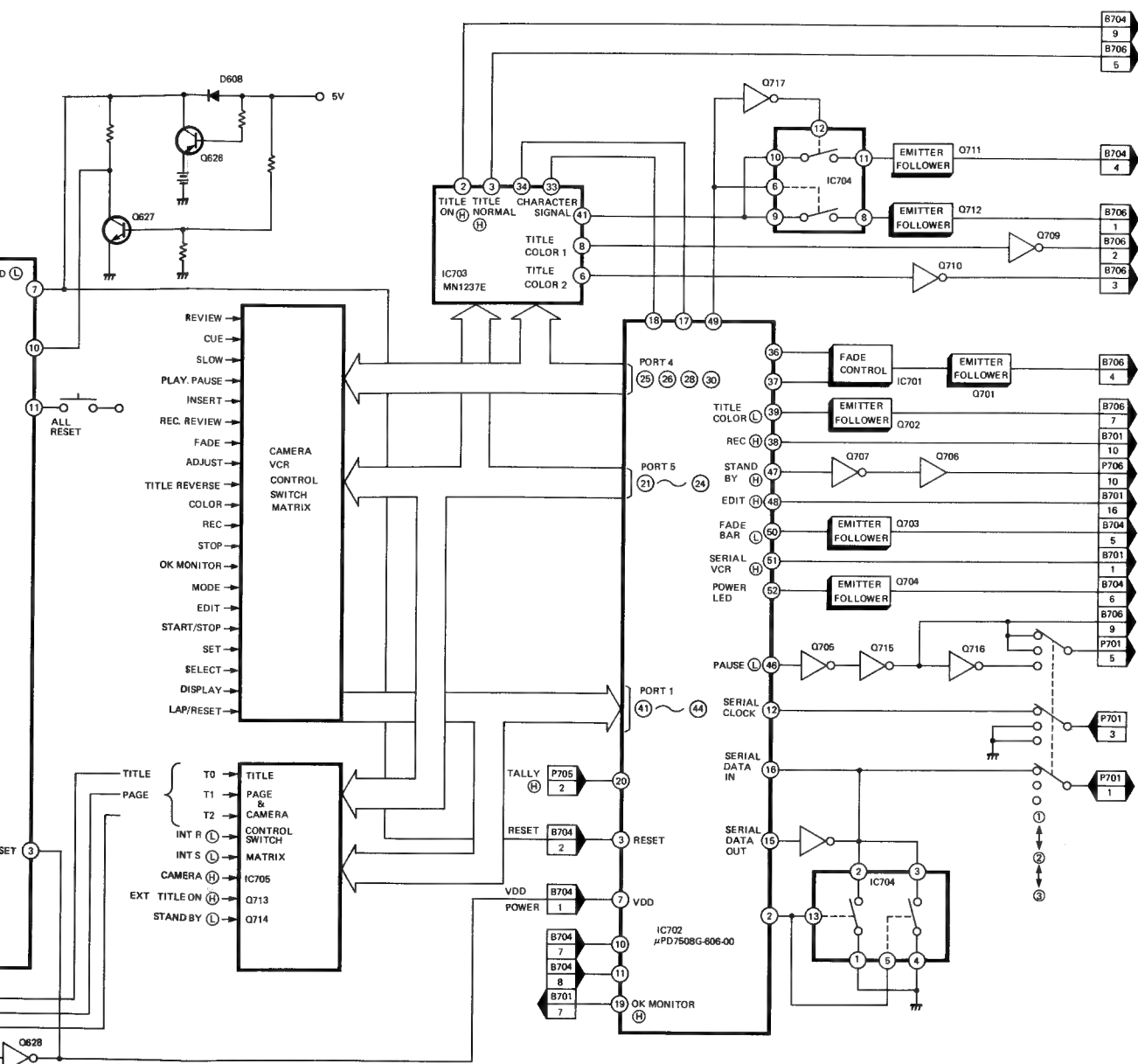
ELECTRONIC VIEWFI



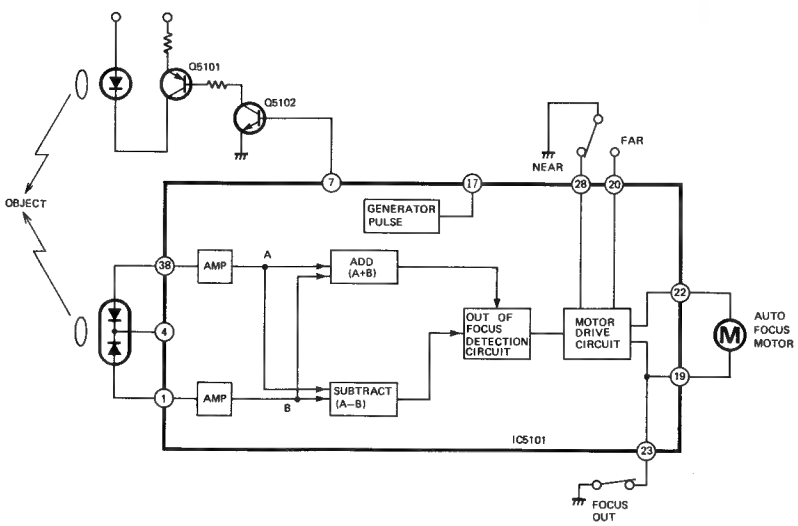
AUTO F



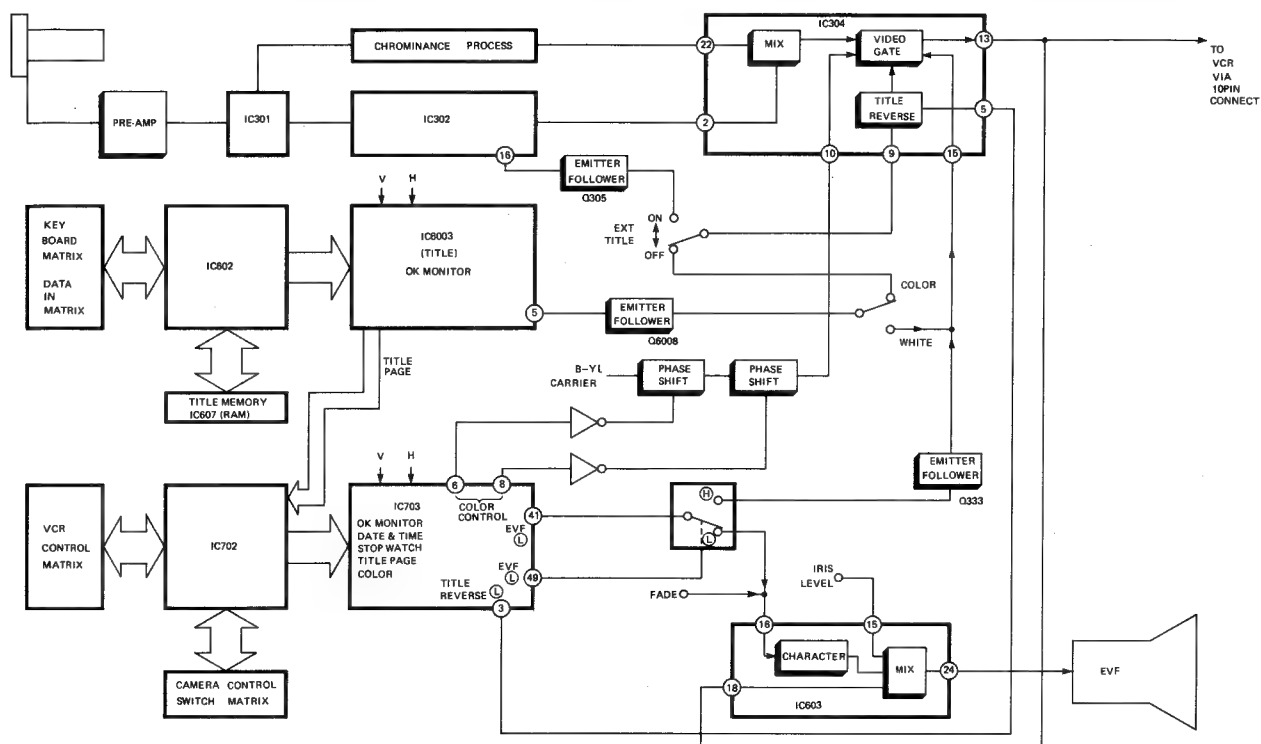
ELECTRONIC VIEWFINDER BLOCK DIAGRAM



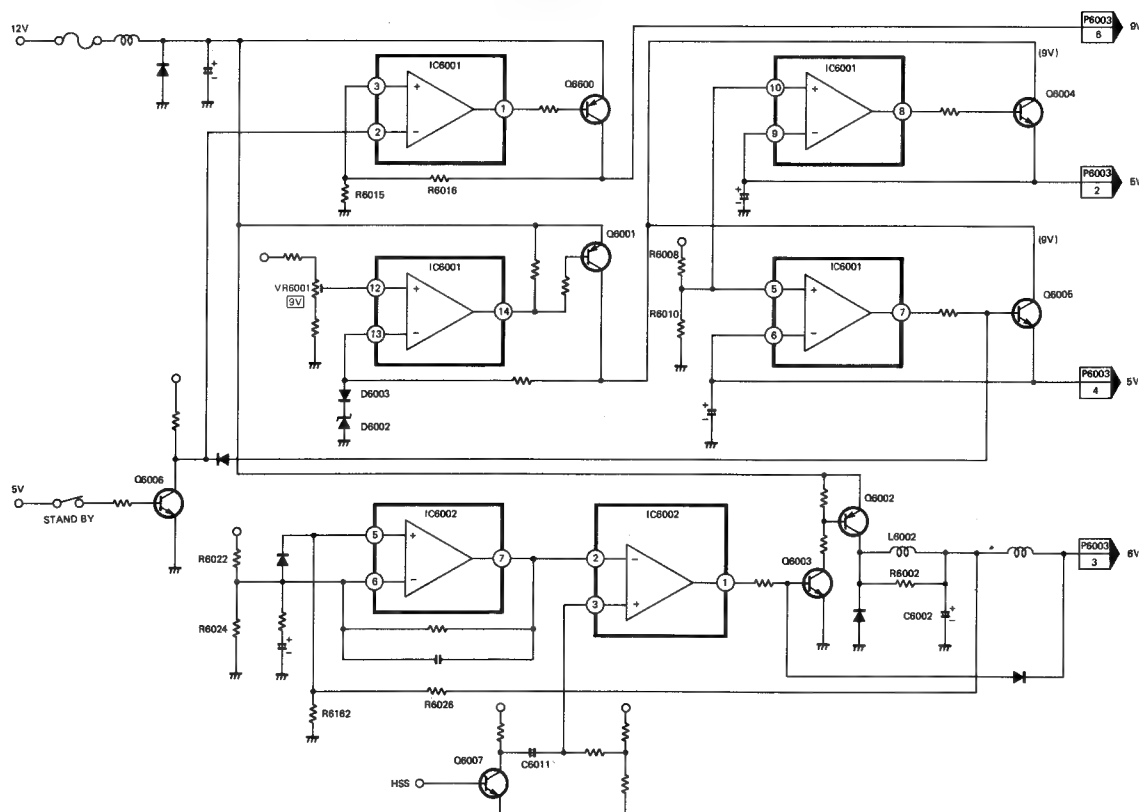
AUTO FOCUS BLOCK DIAGRAM



TITLE & CHARACTER CONTRL BLOCK DIAGRAM



A.V.R. BLOCK DIAGRAM



Panasonic®
MATSUSHITA ELECTRIC

Service Manual

Color Video Camera

PK-958

Vol. 4

Schematic Diagrams
Printed Circuit
Board Diagrams



PK-958

SPECIFICATIONS

Power Source: DC 12V \pm 10%
 AC 120V \pm 10%, 60Hz \pm 0.5%
 (with Power Supply Unit)

Power Consumption: DC 6.6W at 12V DC (Battery)
 (with E.V.F.) (6W with Auto Focus off)
 DC 2.0W at standby

Newvicon Tube
 System: 2/3" frequency separation single tube
 system (built in stripe filter)

Single Carrier
 Frequency: 5MHz

Focus System: Electro-static type

Lens Mounting: Built in zoom lens (not "C" mount)

Lens: 8:1 zoom lens with auto/manual iris
 control
 Power zoom lens (2 speed) and macro
 construction
 F: 1.4, f: 11mm ~ 88mm
 d: 1.0m to infinity

Lens Diameter: 58mm

Light Sensitivity: Minimum light intensity on optical
 image: 7 lux (F: 1.4)
 Optimum light intensity on optical
 image: 900 lux

Video Output Level: 1.0 Vp-p, 75 Ω (Standard NTSC signal)

Sync. System: Internal Sync.: RS-170

Signal to Noise Ratio: More than 45dB

Horizontal Resolution: 300 lines

Color Temperature

Control: 2 step switch (indoor/outdoor) &
 Auto adjust

Microphone: Stereo microphone

Audio Output Level: -20dB, Hi-impedance

Audio Output

Impedance: High impedance (1 K Ω)

External Microphone

Input Impedance: 600 Ω unbalanced

(Left, Right)

Electronic Viewfinder: Monochrome 1 inch CRT

Operating

Temperature: 5°C to 40°C

Operating Humidity: 10% to 75%

Operating Position: Normal position and Gain up position

Weight:

Camera Head with E.V.F.
 5.5 lbs (with lens, 7 ft cable & shoulder
 pad/handle grip)
 AC adaptor (option)
 2.4 lbs

Dimensions:

Camera Head with E.V.F.
 8.4"(W) \times 7.7"(H) \times 16.4"(D)
 210mm(W) \times 192mm(H) \times 409mm(D)
 AC adaptor (option)
 3"(W) \times 3"(H) \times 6"(D)
 79mm(W) \times 75mm(H) \times 149mm(D)

Weight and dimensions shown are approximate.

Specifications are subject to change without notice.

Panasonic

Panasonic Company
 Division of Matsushita Electric
 Corporation of America
 One Panasonic Way, Secaucus,
 New Jersey 07094

Panasonic Hawaii Inc.
 91-238 Kauhū St. Ewa Beach
 P.O. Box 774
 Honolulu, Hawaii 96808-0774

Panasonic Canada
 Division of Matsushita Electric
 of Canada Limited
 5770 Ambler Drive, Mississauga,
 Ontario, L4W 2T3

Panasonic Sales Company,
 Division of Matsushita Electric
 of Puerto Rico, Inc.
 Ave. 65 De Industrial Park
 Victoria Industrial Park
 Carolina, Puerto Rico 00630

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DEFLECTION CIRCUIT BOARD (VEPW0257), VERTICAL DEFLECTION CIRCUIT BOARD (VEPW0321),
VCR/CAMERA SW CIRCUIT BOARD (VEPW0278) & TUBE SOCKET CIRCUIT BOARD (VEPW0109C)



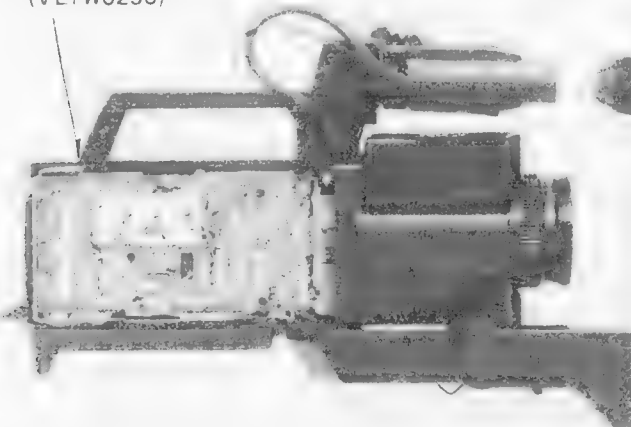
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1000	93	1000000	93.0
1000	94	1000000	94.0
1000	95	1000000	95.0
1000	96	1000000	96.0
1000	97	1000000	97.0
1000	98	1000000	98.0
1000	99	1000000	99.0
1000	100	1000000	100.0

CIRCUIT BOARD LAYOUT



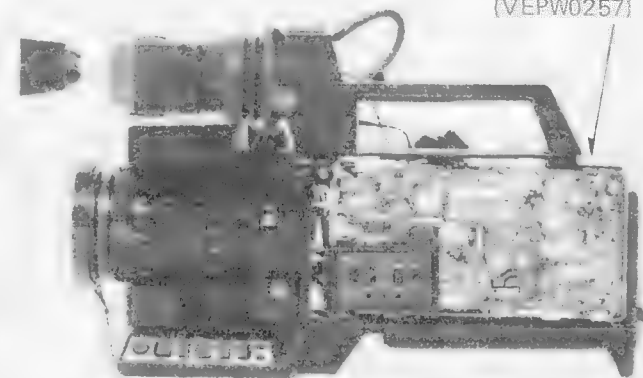
Left Side View

Process Circuit Board
(VEPW0256)



Right Side View I

Deflection Circuit Board
(VEPW0257)



Right Side View II

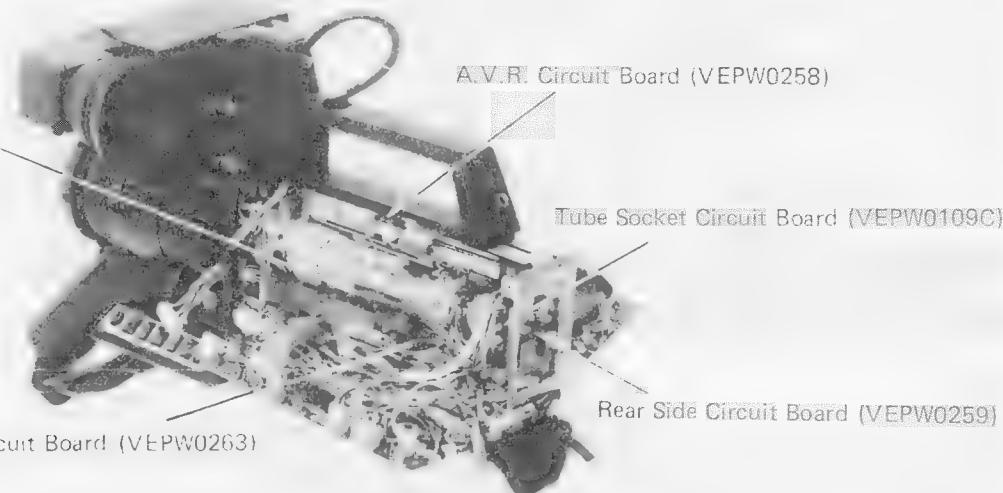
Pre-Amp Circuit Board
(VEPW0250)

A.V.R. Circuit Board (VEPW0258)

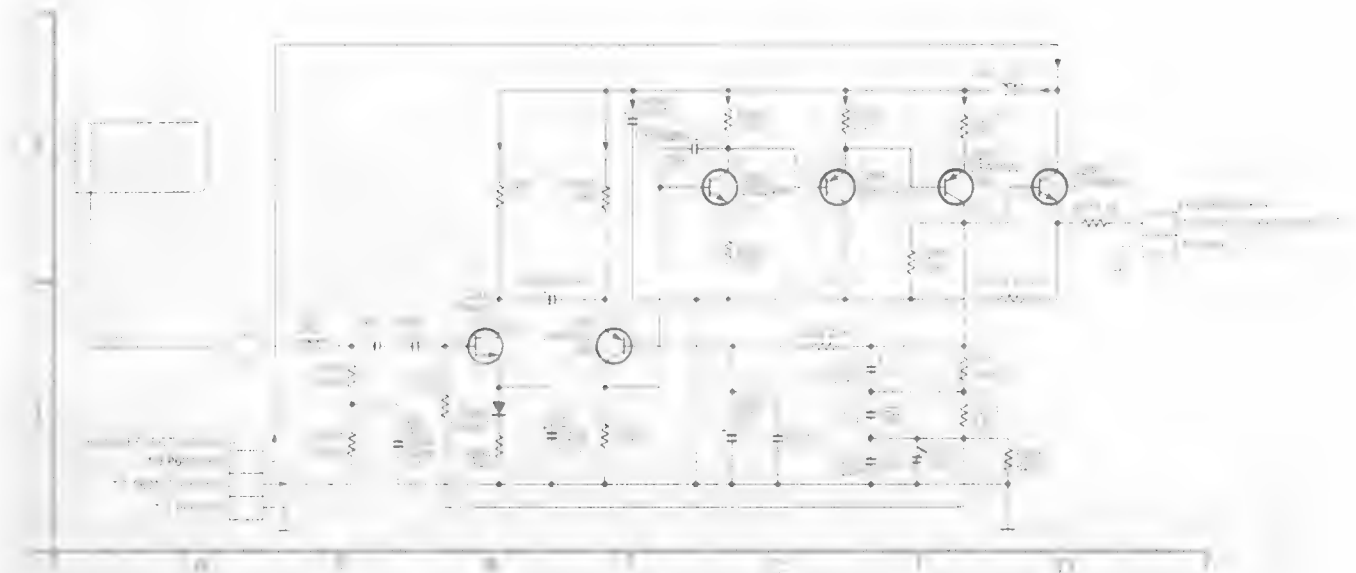
Tube Socket Circuit Board (VEPW0109C)

Micro Processor Circuit Board (VEPW0263)

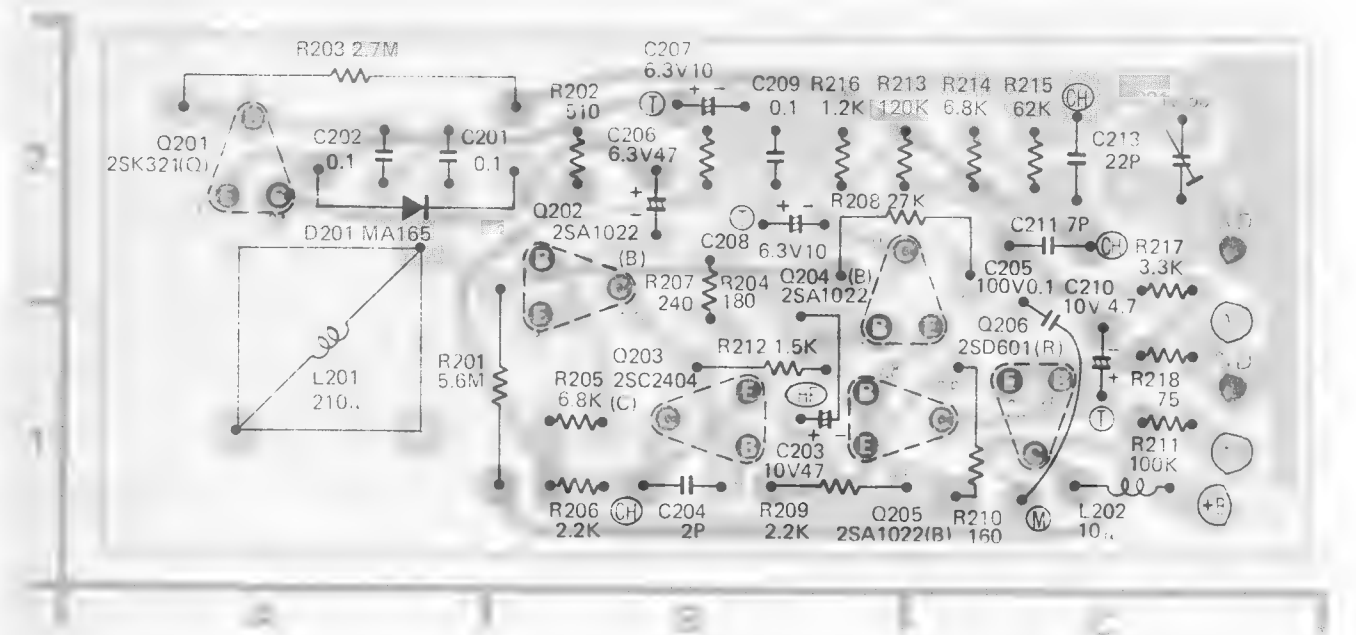
Rear Side Circuit Board (VEPW0259)



PRE-AMP SCHEMATIC DIAGRAM

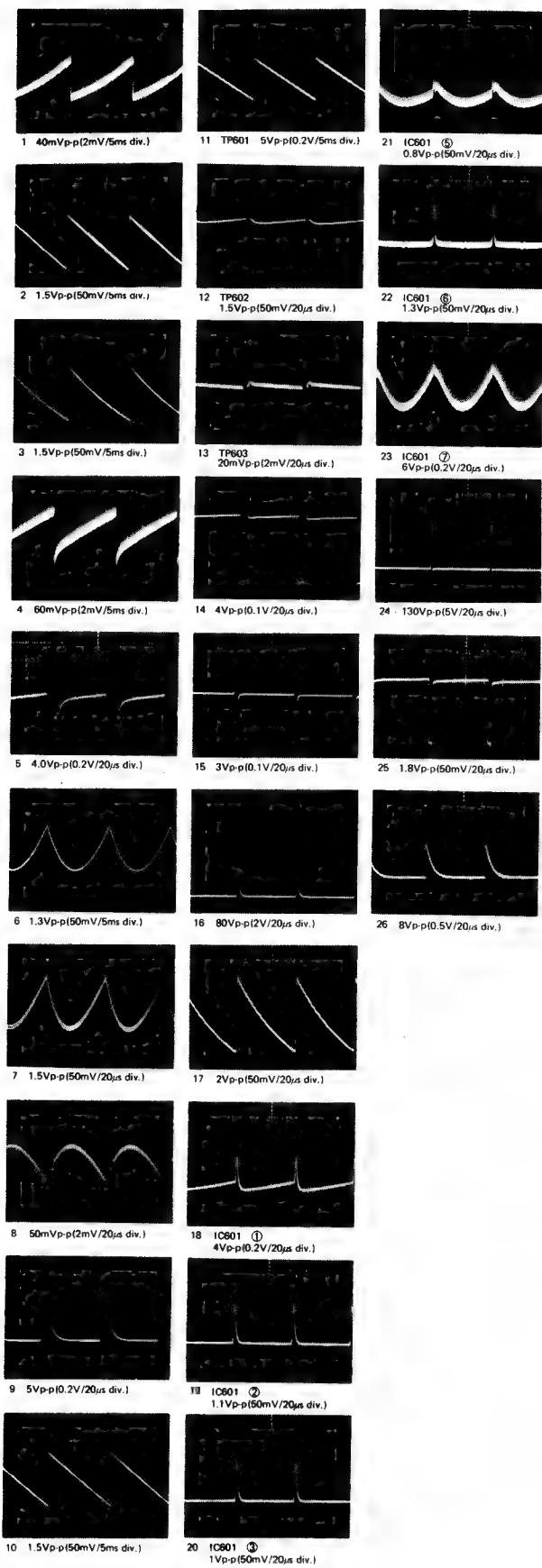


PRE-AMP CIRCUIT BOARD (VEPW0250)

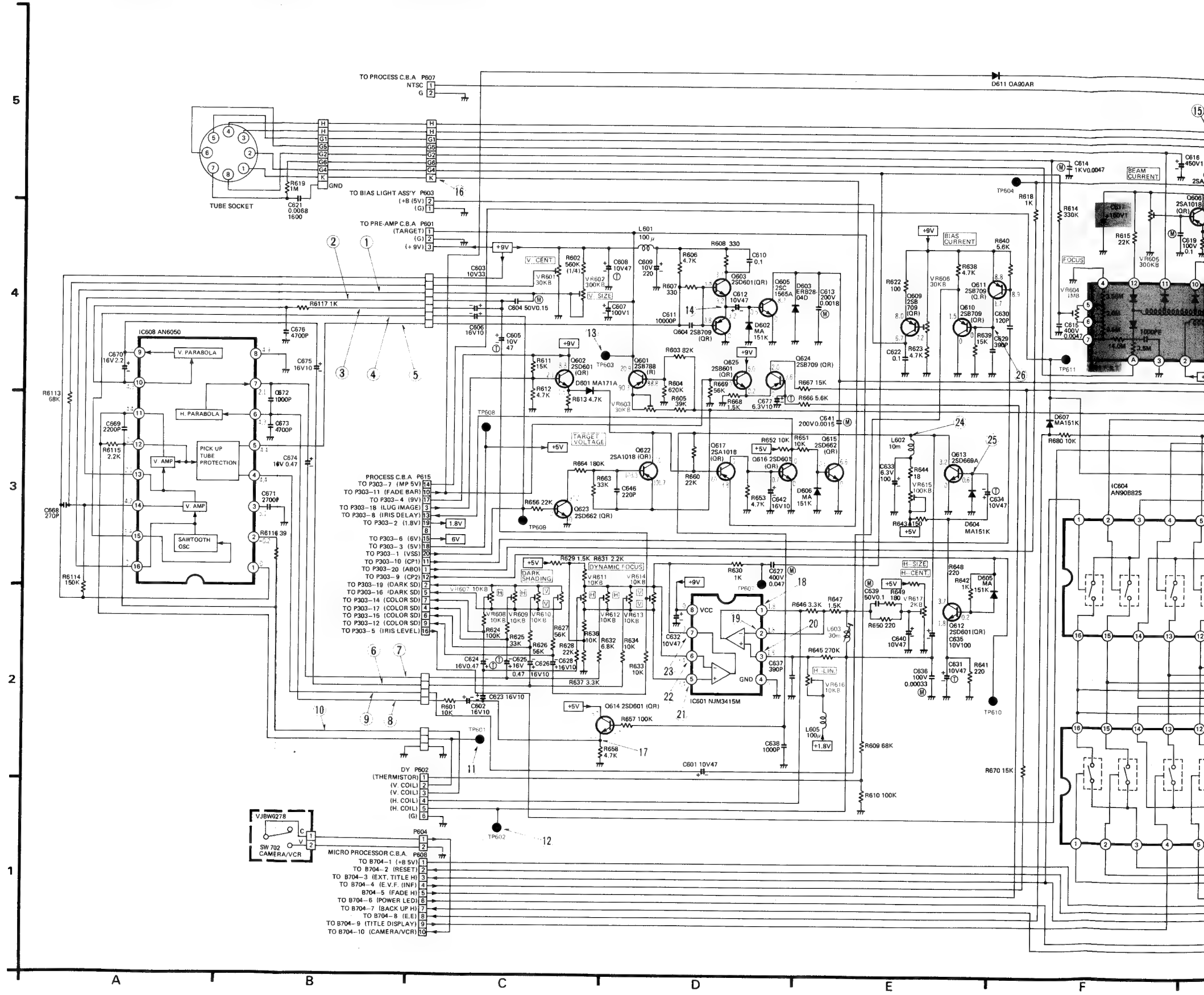


SPECIAL NOTE

SIGNAL WAVE FORM (DEFLECTION)

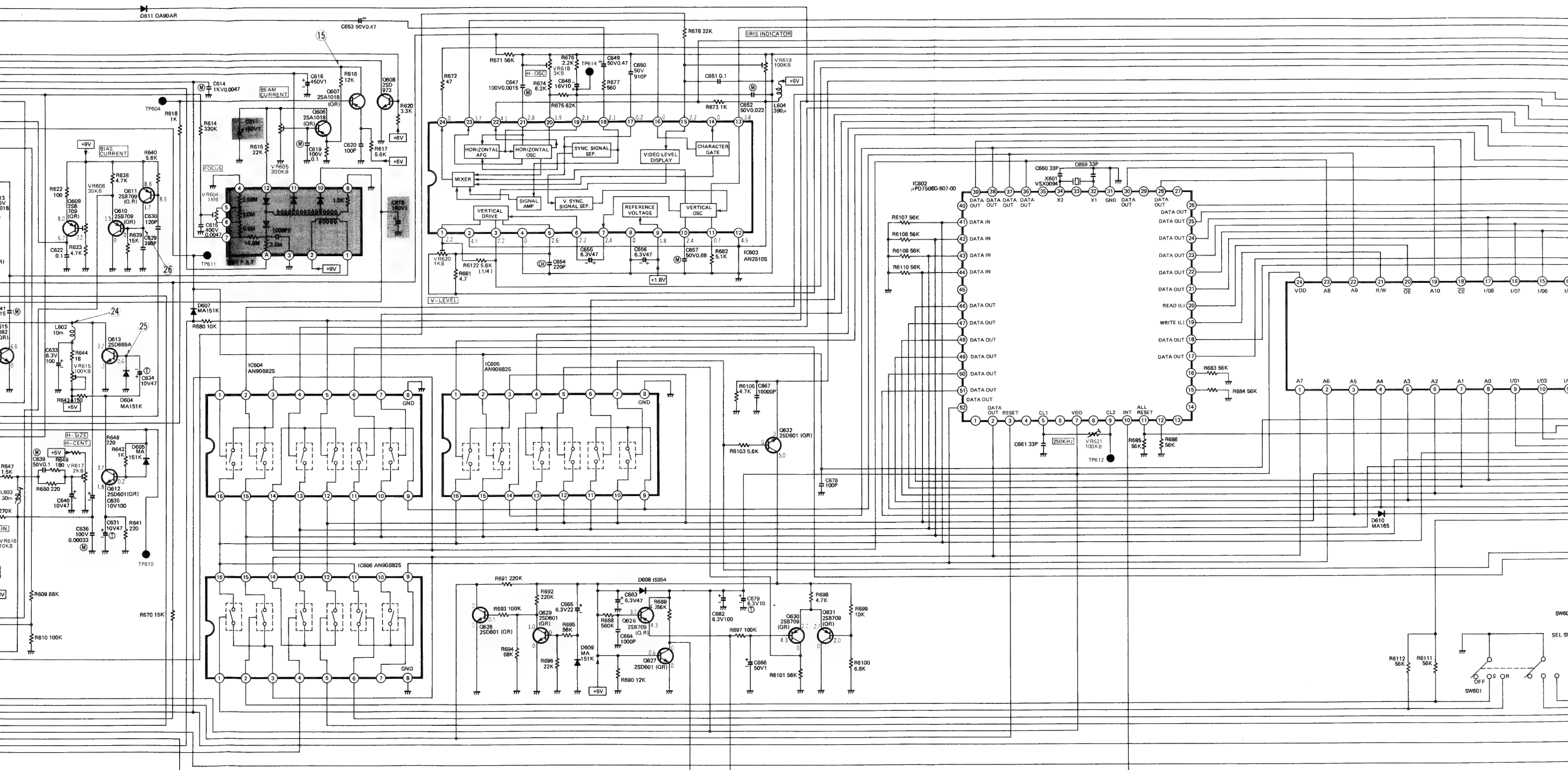


DEFLECTION SCHEMATIC DIAGRAM



- 1  MYLAR CAPACITOR
- 2  NON POLARITY CAPACITOR
- 3  TANTALUM CAPACITOR

SPECIAL NOTE: All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.



E

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M




- SPECIAL NOTE** All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.



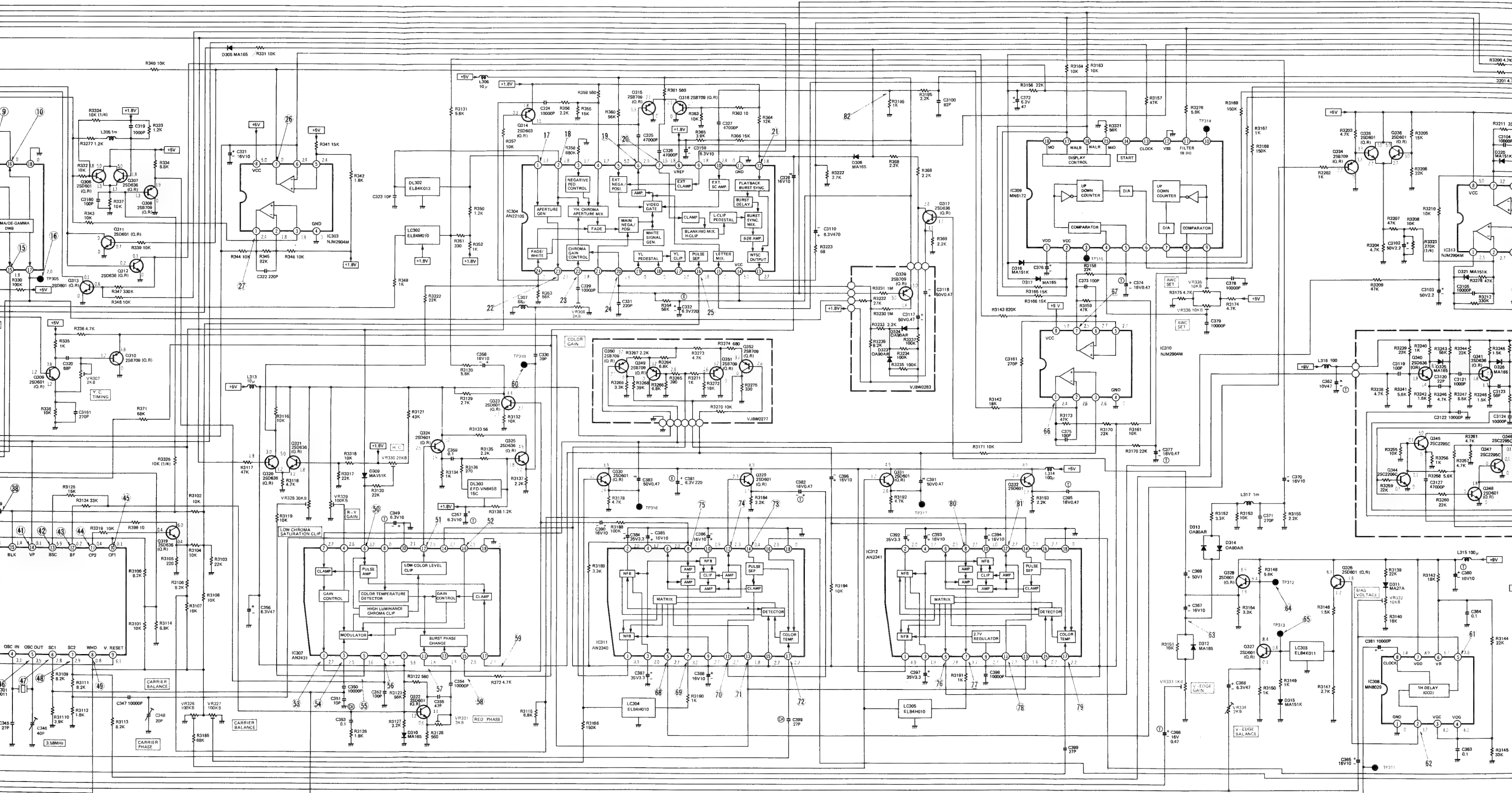
VR601	V—CENT.	C—4
VR602	V—SIZE	C—4
VR603	TARGET VOLTAGE	D—3
VR604	FOCUS	F—4
VR605	BEAM CURRENT	F—4
VR606	BIAS CURRENT	E—4
VR607	DARK SHADING H	C—2
VR608	DARK SHADING H	C—2
VR609	DARK SHADING V	C—2
VR610	DARK SHADING V	C—2
VR611	DYNAMIC FOCUS H	C—2
VR612	DYNAMIC FOCUS H	D—2
VR613	DYNAMIC FOCUS H	D—2
VR614	DYNAMIC FOCUS V	D—2
VR615	H—SIZE	E—3
VR616	H—LIN.	E—2
VR617	H—CENT.	E—2
VR618	H—OSC	H—5
VR619	IRIS INDICATOR	I—5
VR620	V—LEVEL	G—4
VR621	250KHz	K—3

1



- 1  MYLAR CAPACITOR
- 2  NON POLARITY CAPACITOR
- 3  TANTALUM CAPACITOR

SPECIAL NOTE All integrated
therefore require the special ha
section of this service manual.



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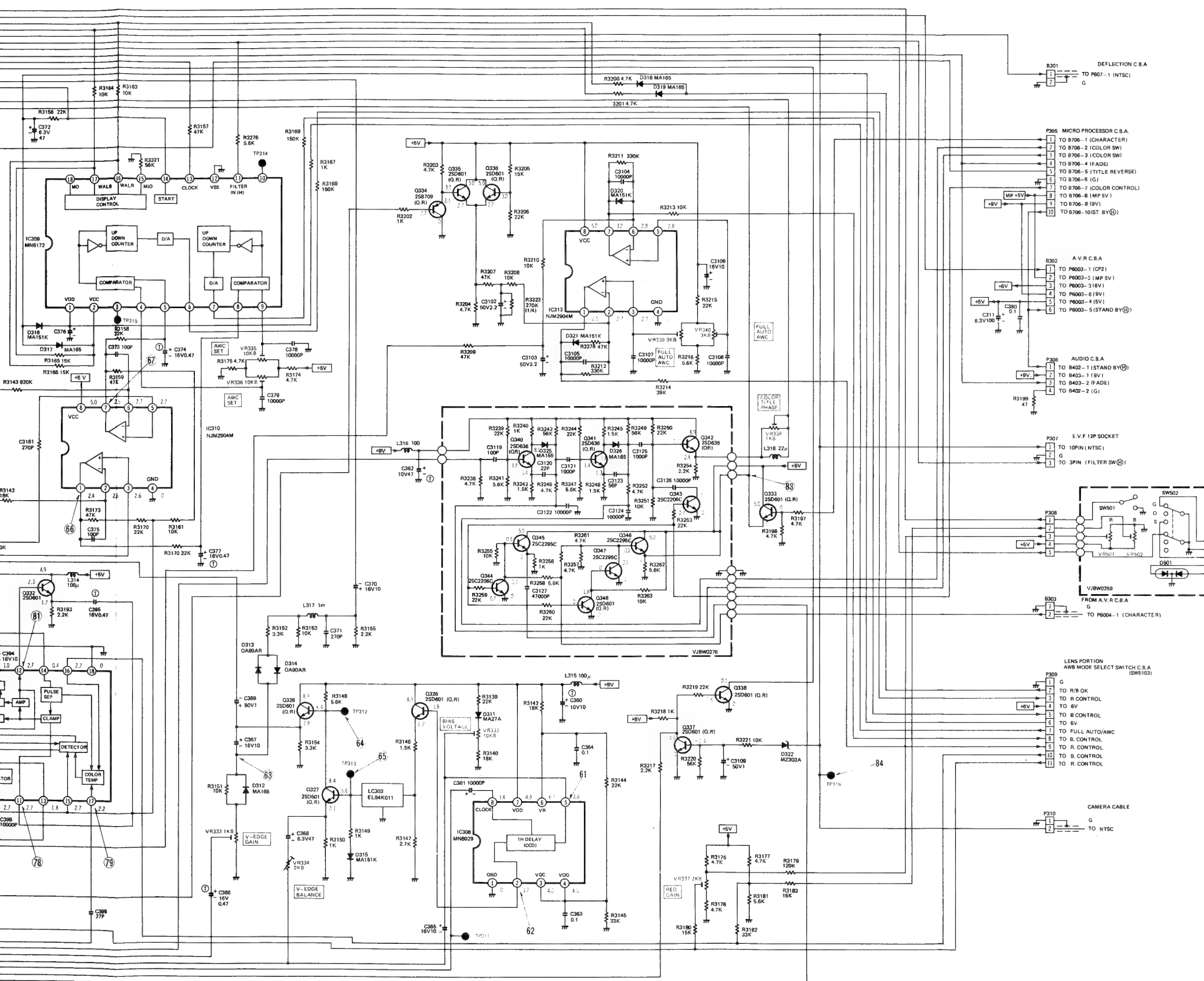
K

L

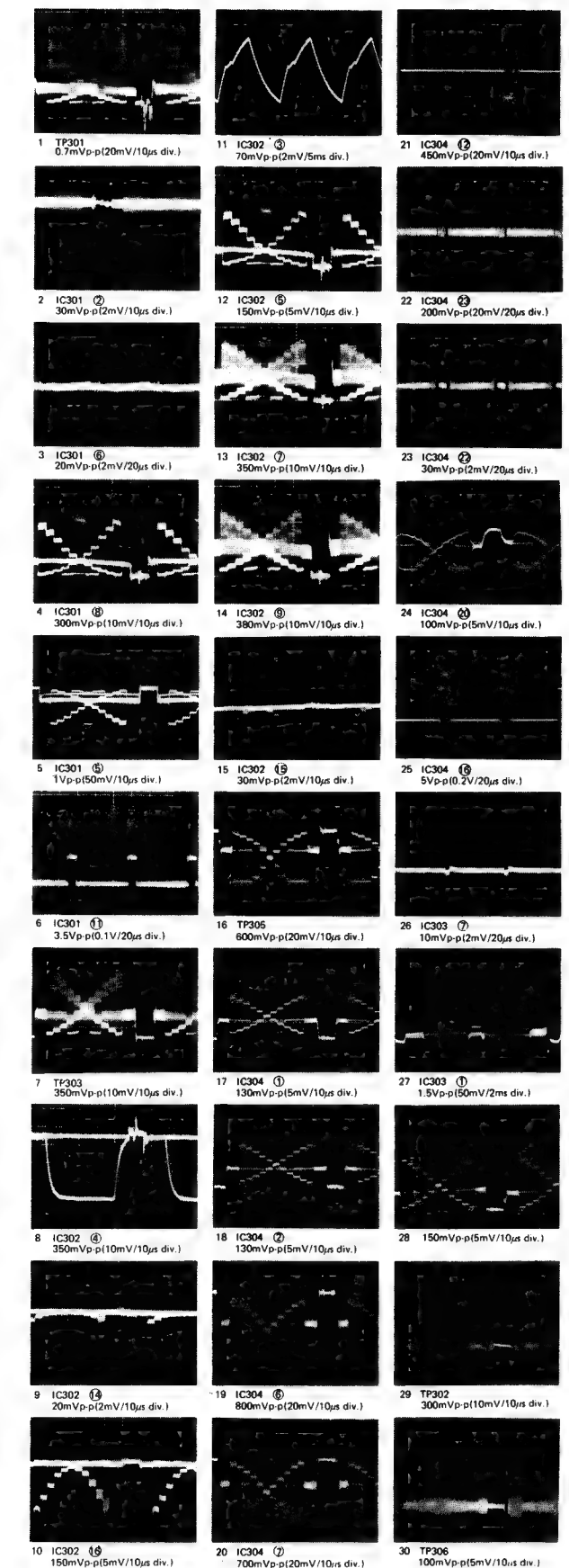
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N

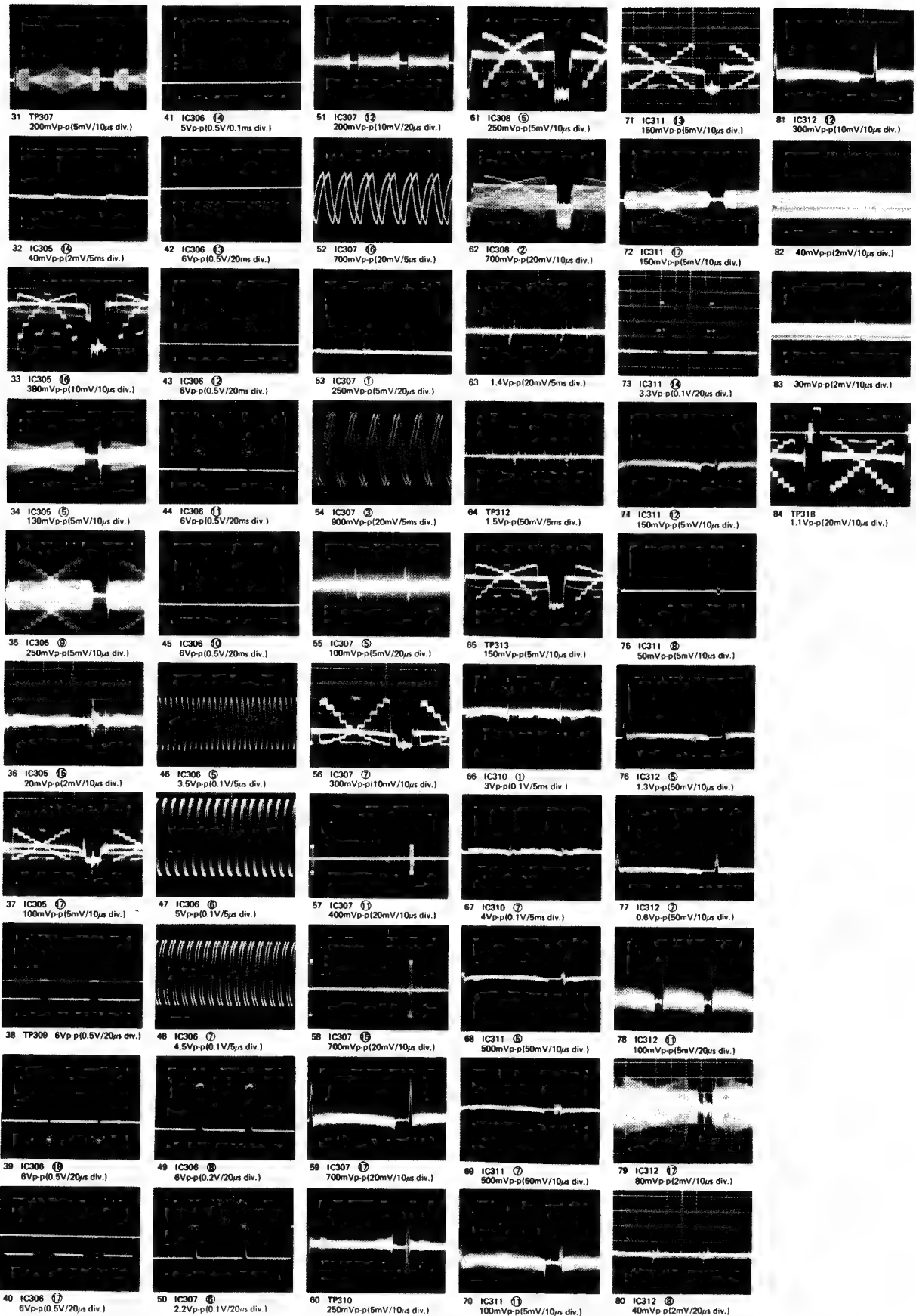
SIGNAL WAVE FORM (PROCESS)



VR301	AUTO IRIS	A-4
VR302	NTSC PED.	D-5
VR303	CARRIER GAIN	D-5
VF304	OB OFF SET	D-4
VR305	R.B. SEP.	D-3
VR306	γ -SET.	F-4
VR307	Y. C. TIMING	F-3
VR308	COLOR GAIN	I-4
VR309	R.B. SEP.	B-3
VR310	COLOR SHADING V	B-2
VR311	COLOR SHADING V	B-2
VR312	COLOR SHADING H	B-2
VR313	COLOR SHADING H	B-2
VR314	COLOR SHADING V	B-1
VR315	COLOR SHADING V	B-1
VR316	COLOR SHADING H	B-1
VR317	COLOR SHADING H	B-1
VR318	B- γ 4	D-2
VR319	B- γ 3	D-2
VR320	B- γ 2	D-2
VR321	B- γ 1	D-2
VR322	R- γ 4	D-1
VR323	R- γ 3	D-1
VR324	R- γ 2	D-1
VR325	R- γ 1	D-1
VR326	CARRIER BALANCE	G-1
VR327	CARRIER BALANCE	G-1
VR328	LOW CHROMA SATURATION CLIP	H-1
VR329	R-Y GAIN	H-1
VR330	H. C.	H-2
VR331	RED-PHASE	H-1
VR332	BIAS VOLTAGE	N-2
VR333	V-EDGE GAIN	M-1
VR334	V-EDGE BALANCE	M-1
VR335	AWC SET	M-1
VR336	AWC SET	M-1
VR337	RED GAIN	O-1
VR338	TITLE PHASE	O-1
VR339	FULL AUTO AWC	O-1
VR340	FULL AUTO AWC	O-1
C346	3.58MHz	F-4
C348	CARRIER PHASE	G-1



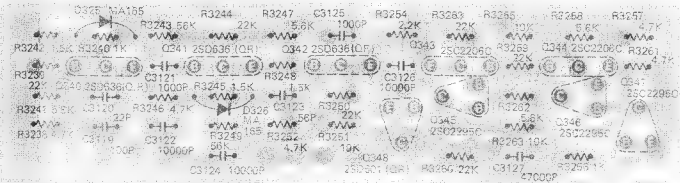
SIGNAL WAVE FORM (PROCESS)



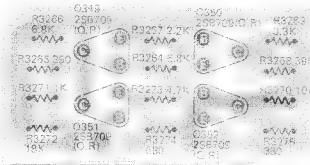
PROCESS CIRCUIT BOARD (VEPW0256), YL FILTER CIRCUIT BOARD (VEPW0275)
COLOR TITLE CIRCUIT BOARD (VEPW0276), MATRIX CIRCUIT BOARD (VEPW0277)
COLOR ERROR COMPENSATION (VEPW0283) & REAR SIDE CIRCUIT BOARD (VEPW0259)

Circuit Board

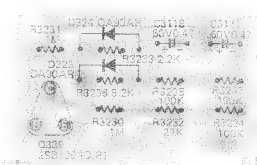
IC301	A-2	VR301	C-4
IC302	B-2	VR308	E-3
IC303	C-2	VR309	A-3
IC304	D-2	VR310	B-1
IC305	A-3	VR311	B-1
IC306	D-3	VR312	B-2
IC307	E-2	VR313	B-2
IC308	G-2	VR315	B-1
IC309	F-2	VR316	B-2
IC311	F-3	VR317	B-2
IC312	F-2	VR318	B-3
IC313	F-4	VR319	B-3
		VR320	B-3
Q301	G-1	VR321	B-3
Q302	G-1	VR322	B-3
Q303	A-1	VR323	B-3
Q304	B-2	VR324	B-3
Q305	C-2	VR325	B-3
Q306	B-4	VR326	D-3
Q307	B-4	VR327	D-3
Q308	B-4	VR328	F-2
Q309	C-4	VR329	F-1
Q310	C-4	VR330	F-1
Q311	C-2	VR331	F-3
Q312	C-2	VR332	C-3
Q313	D-2	VR333	B-3
Q314	D-2	VR334	C-3
Q315	E-1	VR335	G-3
Q316	E-2	VR336	G-2
Q317	E-2	VR337	F-3
Q318	A-3	VR338	D-3
Q319	D-3	VR339	F-3
Q320	F-2	VR340	F-3
Q321	F-1		
Q322	F-3	D301	G-2
Q323	E-1	D302	G-1
Q324	D-4	D303	B-2
Q325	D-4	D304	C-1
Q326	C-3	D305	D-1
Q327	C-3	D306	D-1
Q328	C-3	D307	A-3
Q329	E-3	D309	F-1
Q330	E-3	D310	F-2
Q331	F-2	D311	C-3
Q332	F-2	D312	B-3
Q333	E-4	D313	B-3
Q334	G-3	D314	B-3
Q335	G-4	D315	C-3
Q336	G-4	D316	G-2
Q337	E-1	D317	
Q338	D-1	D318	G-3
		D319	G-3
VR301	G-1	D320	F-4
VR302	A-2	D321	G-4
VR303	A-1	D322	D-1
VR304	A-2		
VR305	A-4	C346	D-3
VR306	C-2	C348	E-2



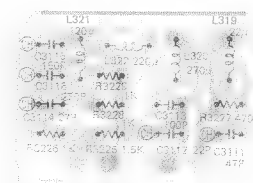
COLOR TITLE C.B.A.



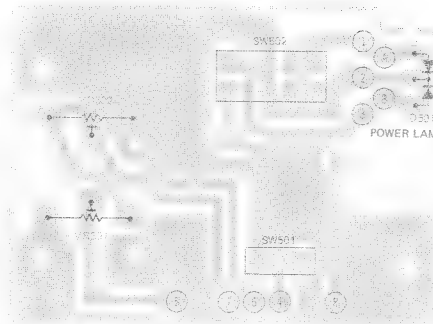
MATRIX C.B.A.



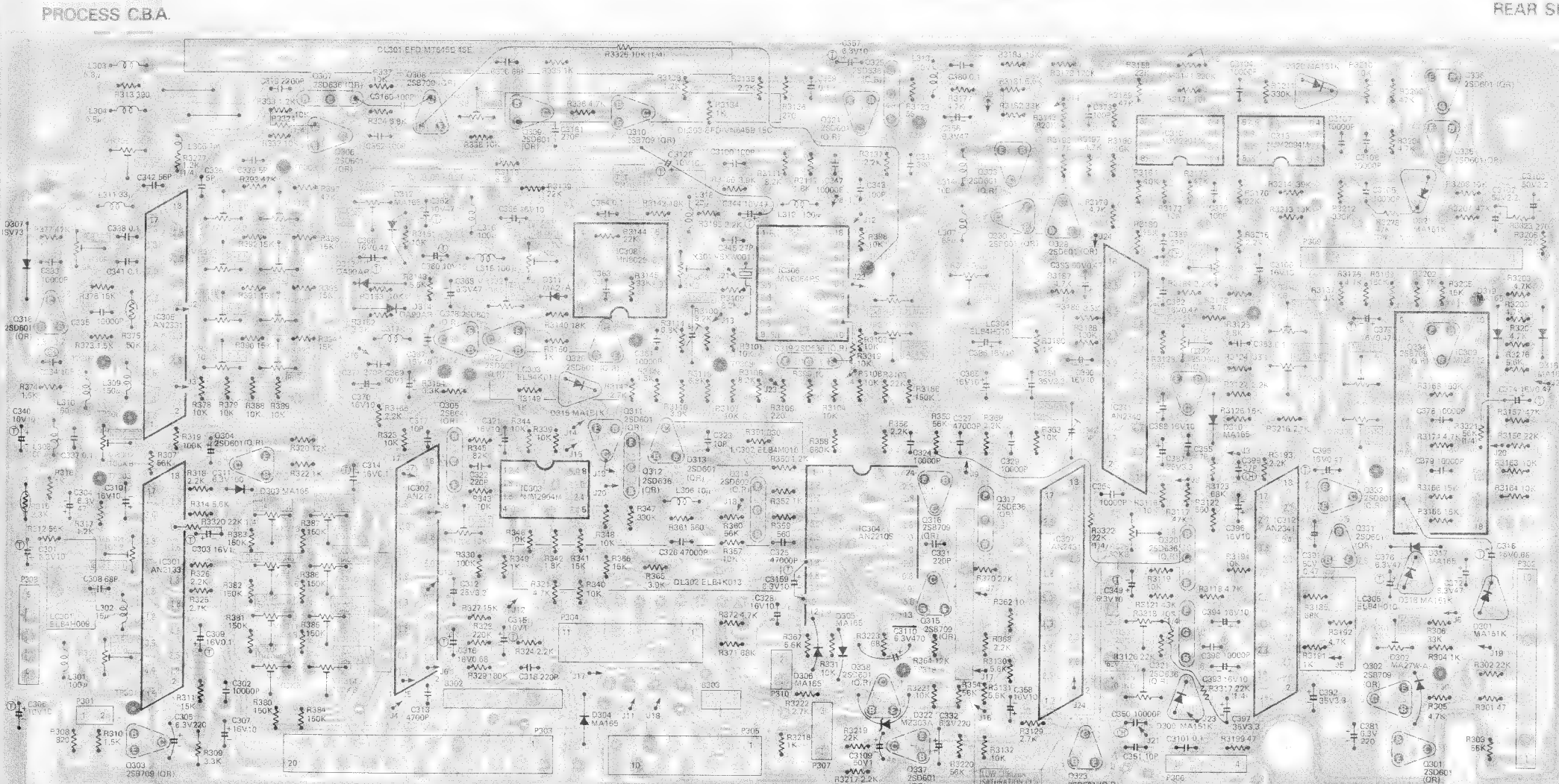
COLOR ERROR
COMPENSATION C.B.A.



YL FILTER C.B.A.



REAR SIDE C.B.A.



PROCESS C.B.A.

P301	1 PRE-AMP IN
	2 G
P302	1 FILTER SW
	2 A.F.M.F.
	3 A.F. STAND BY
	4 FILTER SW
	5 AWC SW
	6 AWC SW
	7 IRIS CONTROL
	8 IRIS DRIVE
	9 IRIS CONTROL
	10 IRIS DRIVE

P305	1 CHARACTER
	2 COLOR SW
	3 COLOR SW
	4 FADE
	5 TITLE REVERSE
	6 G
	7 COLOR CONTROL
	8 +B (5V)
	9 9V
	10 STAND BY H

P306	1 STBY H
	2 9V
	3 FADE
	4 G

P303	1 VSS
	2 1.8V
	3 5V
	4 9V
	5 IRIS
	6 6V
	7 MICRON 5V
	8 IRIS DELAY
	9 CP2
	10 CP1
	11 FADE
	12 COLOR SD
	13 W.H.D
	14 COLOR SD
	15 COLOR SD
	16 DARK SD
	17 COLOR SD
	18 LUG IMAGE
	19 DARK SD
	20 A.B.O

P308	1 GAIN UP
	2 +B (5V)
	3 R. CONTROL
	4 R. CONTROL
	5 N/P

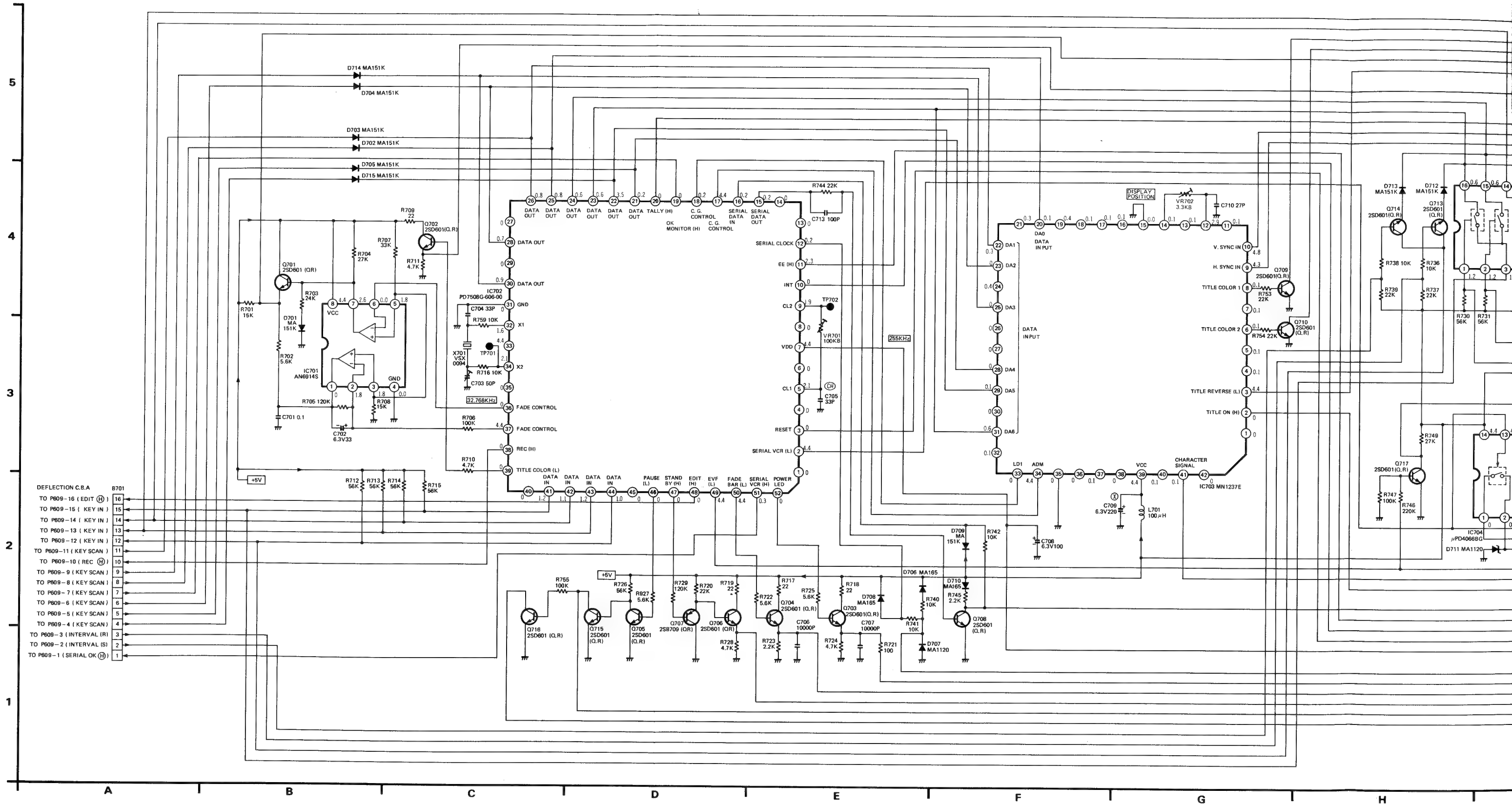
P309	1 G
	2 R/B O.K
	3 R. CONTROL
	4 6V
	5 R. CONTROL
	6 6V
	7 AWC/FULL SW
	8 R. CONTROL
	9 R. CONTROL
	10 R. CONTROL
	11 R. CONTROL

P304	1 W.B. PRECAUTION (R)
	2 A.F. STAND BY L
	3 COLOR TITLE
	4 W.B. PRECAUTION (B)
	5 FILTER SW H
	6
	7 COLOR TITLE
	8 A.F.M.F
	9 EXT TITLE
	10 LOW LIGHT
	11 EXT TITLE

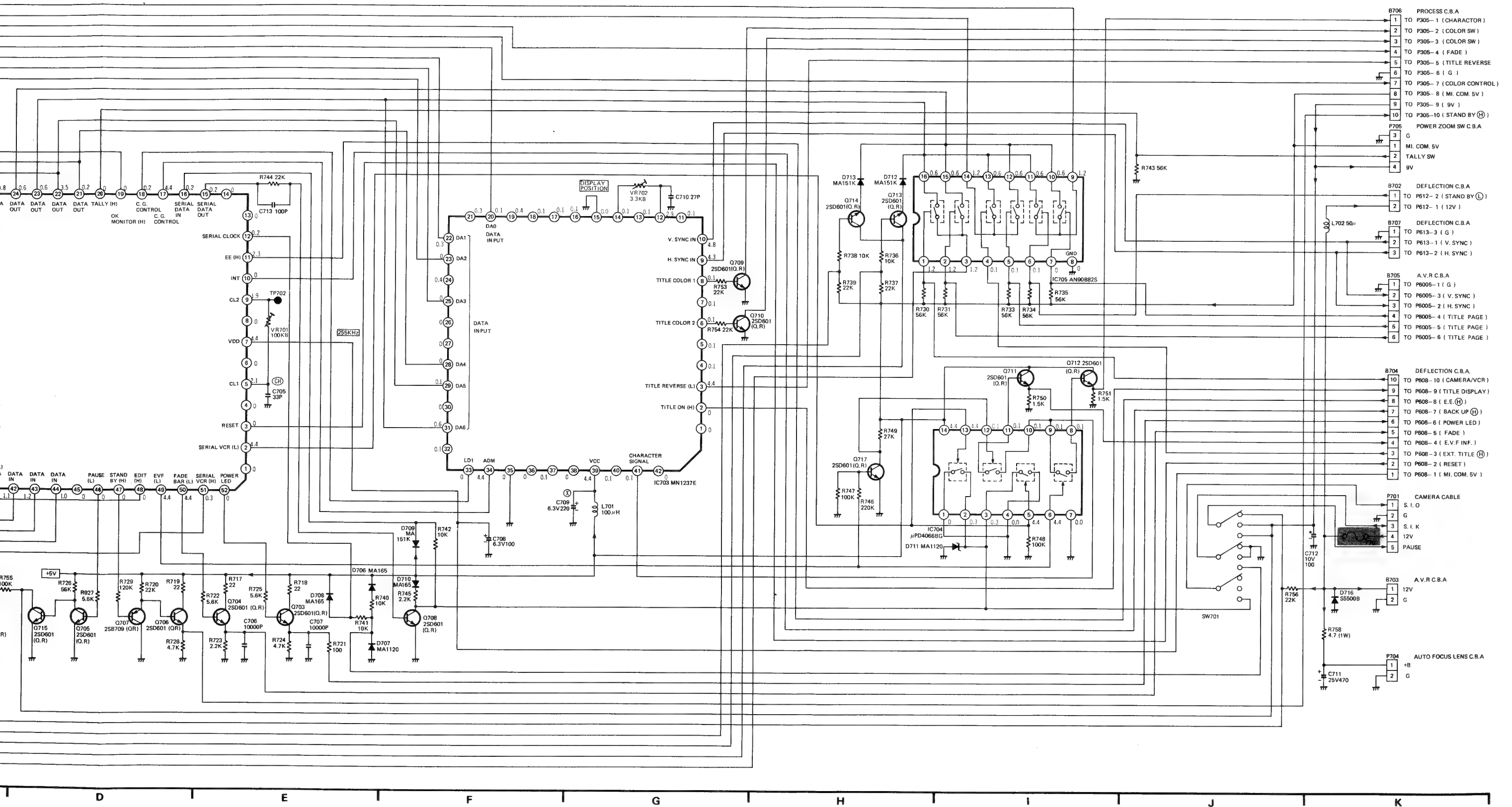
- 1 MYLAR CAPACITOR
- 2 NON POLARITY CAPACITOR
- 3 TANTALUM CAPACITOR

SPECIAL NOTE All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.

MICRO PROCESSOR SCHEMATIC DIAGRAM

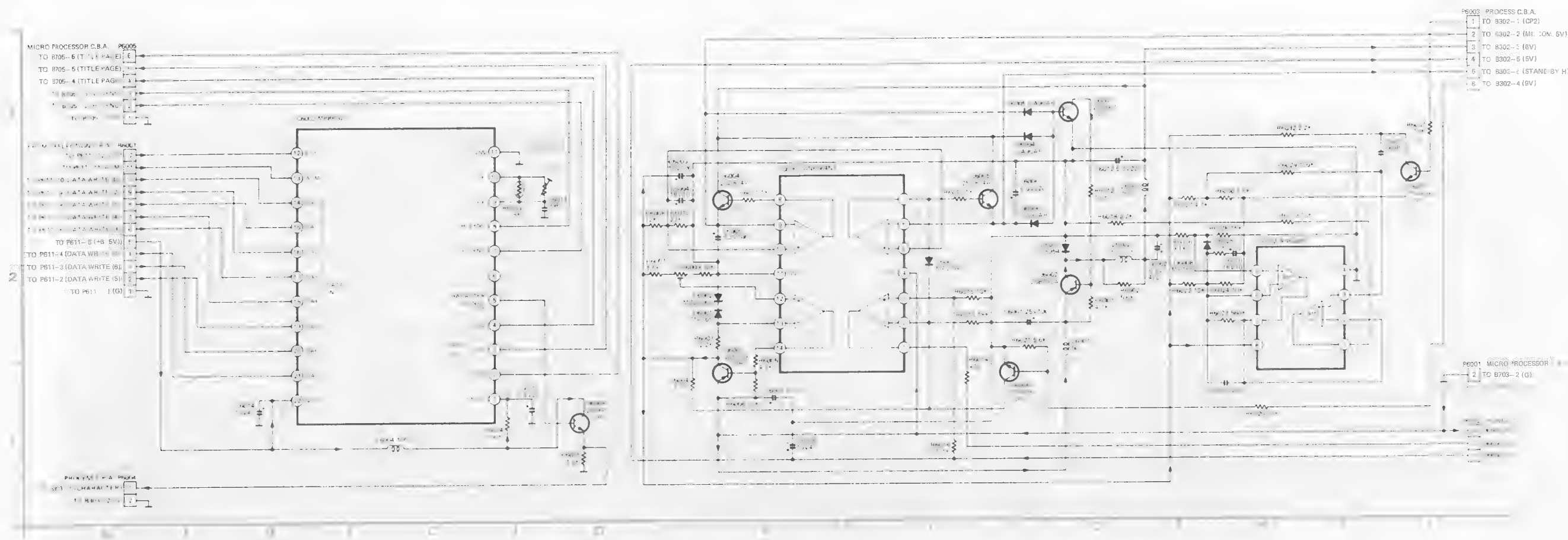


SPECIAL NOTE All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.



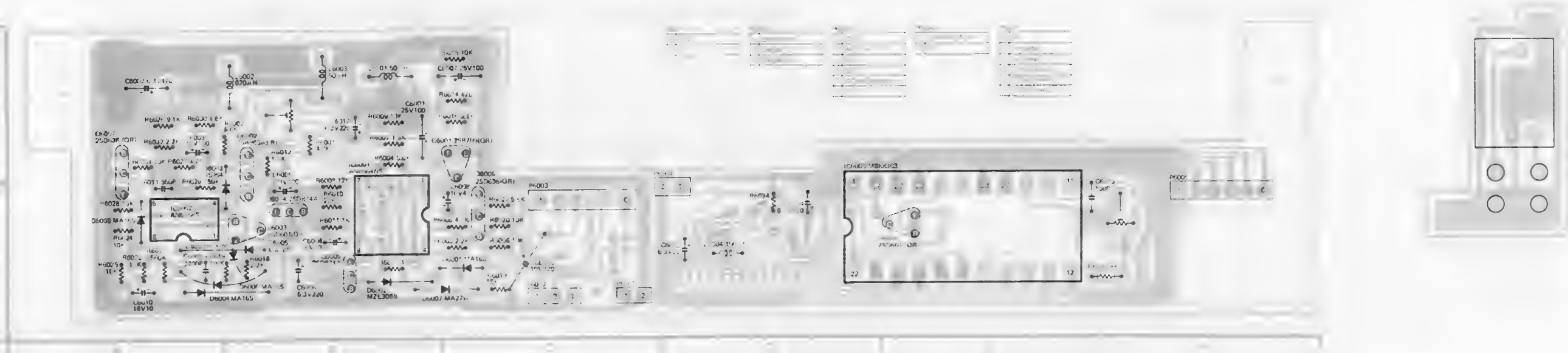
A.V.R. SCHEMATIC DIAGRAM

SPECIAL NOTE: A: Integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.

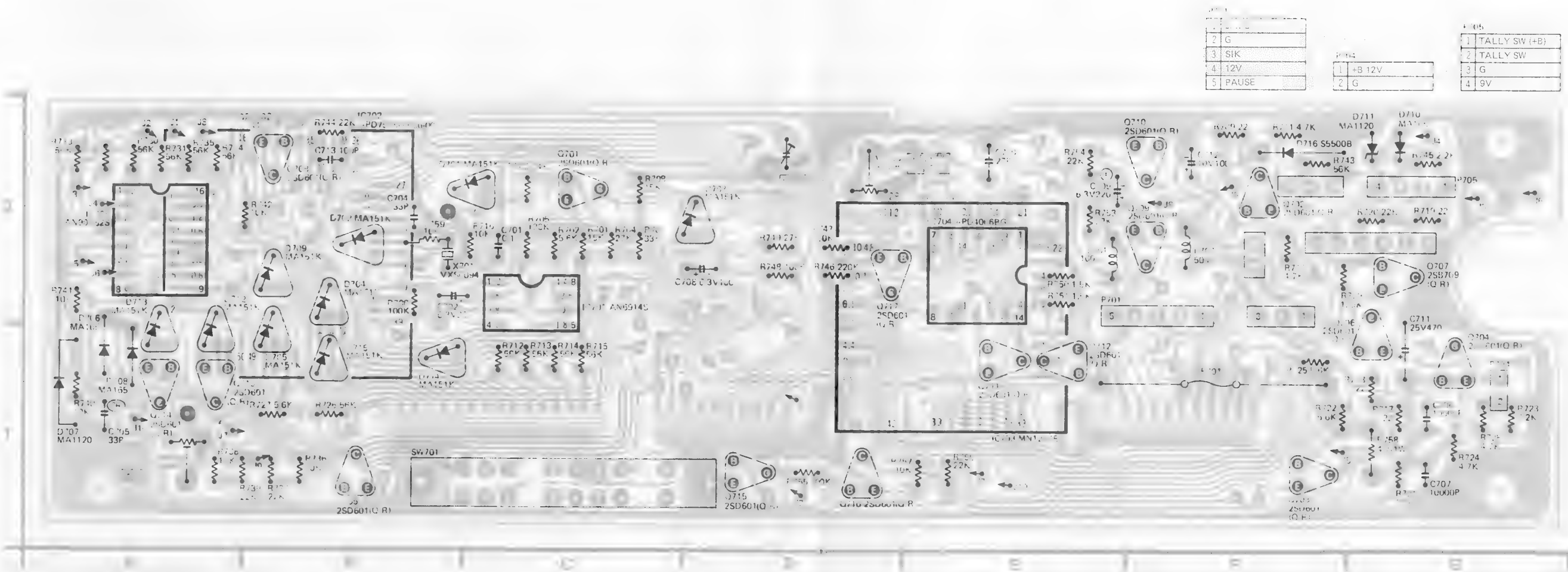


A.V.R. CIRCUIT BOARD (VEPW0258)

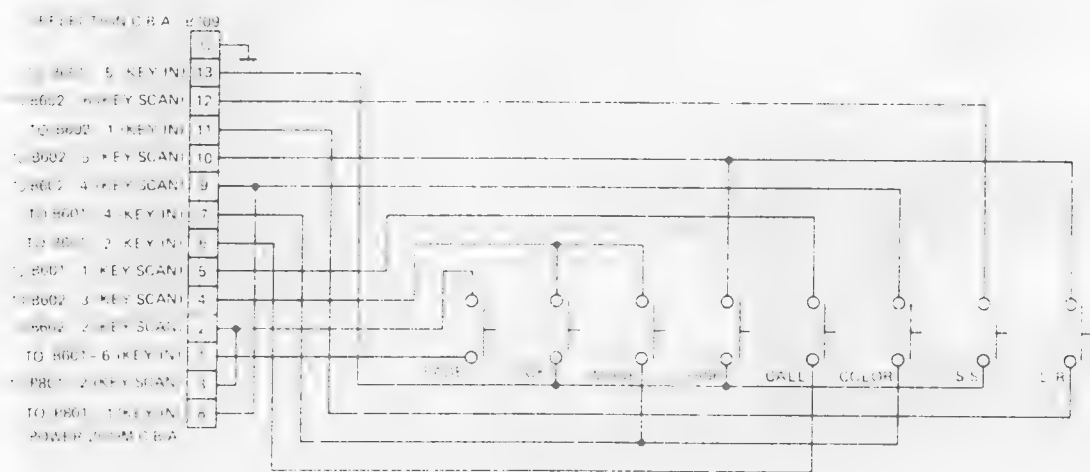
MIC JACK CIRCUIT BOARD (VEPW0280)



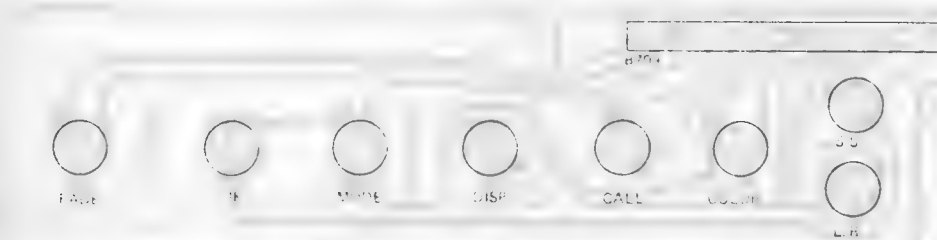
MICRO PROCESSOR CIRCUIT BOARD (VEPW0263)



MICRO PROCESSOR SW SCHEMATIC DIAGRAM

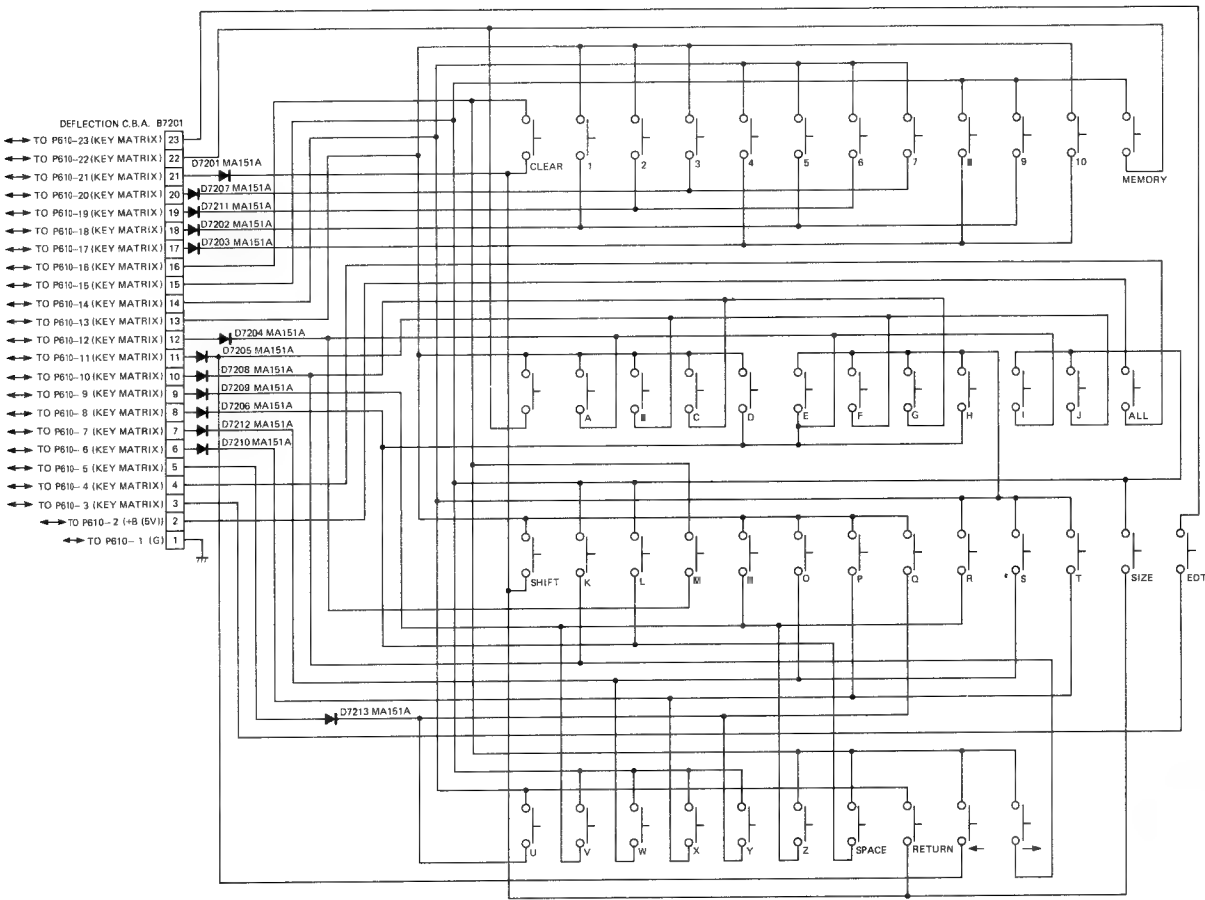


MICRO PROCESSOR SW CIRCUIT BOARD (VEPW0265)

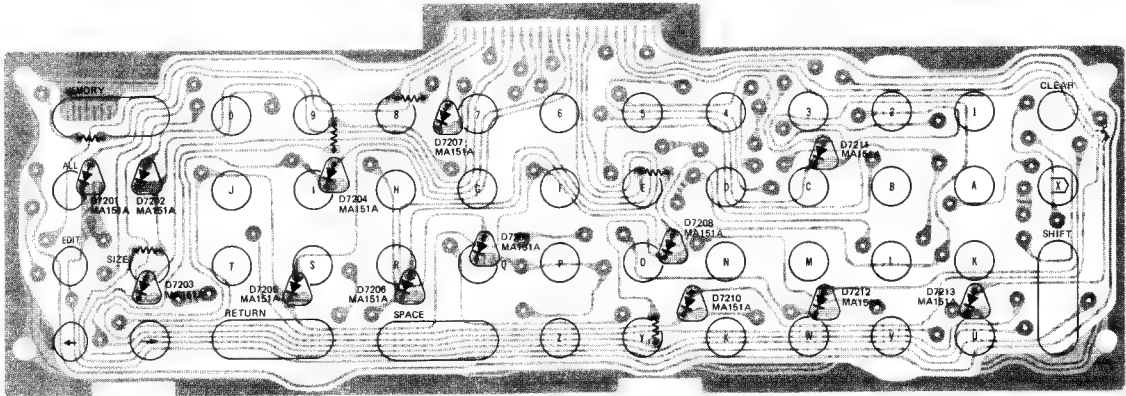


SPECIAL NOTE All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.

KEY BOARD SCHEMATIC DIAGRAM

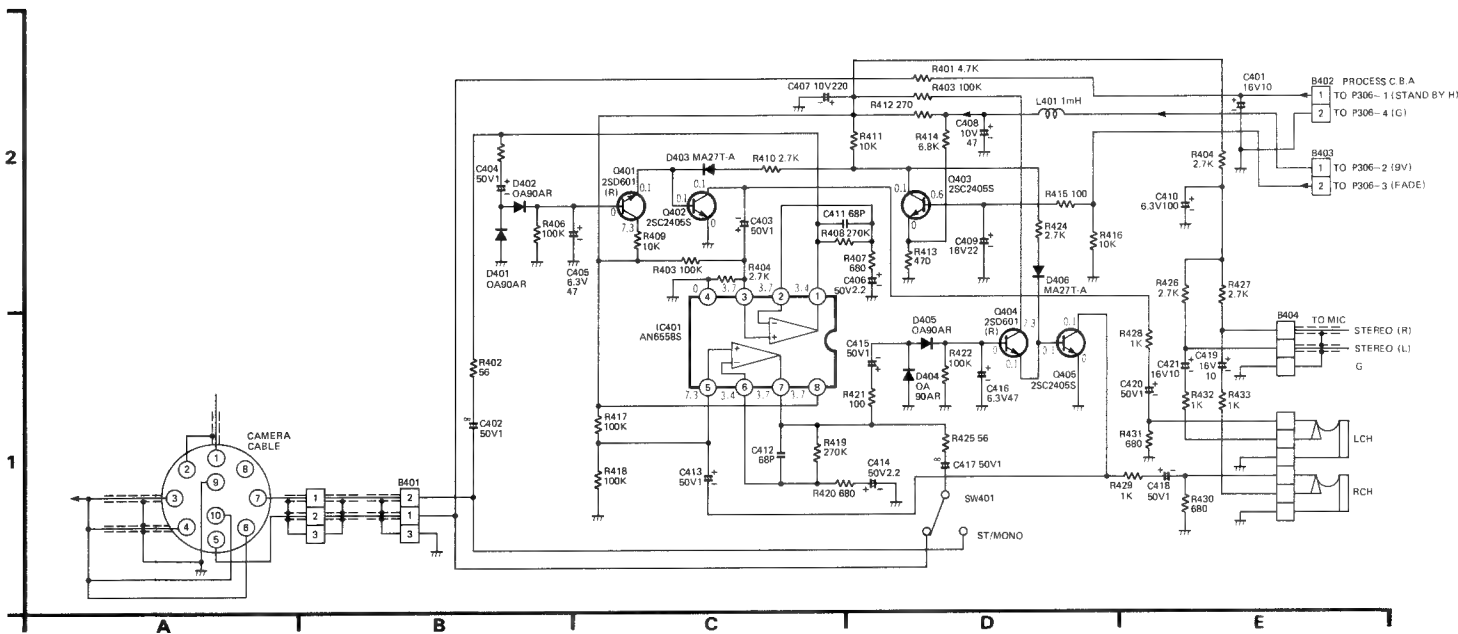


KEY BOARD CIRCUIT BOARD (VEPW0264)

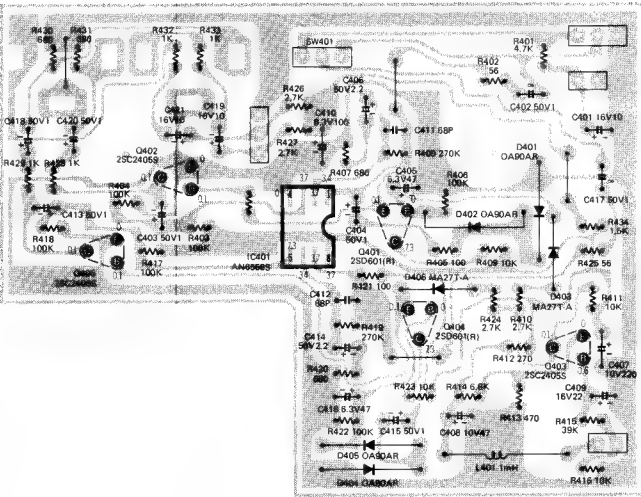


SPECIAL NOTE All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.

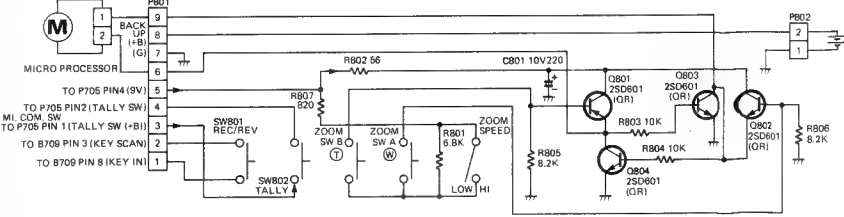
AUDIO SCHEMATIC DIAGRM



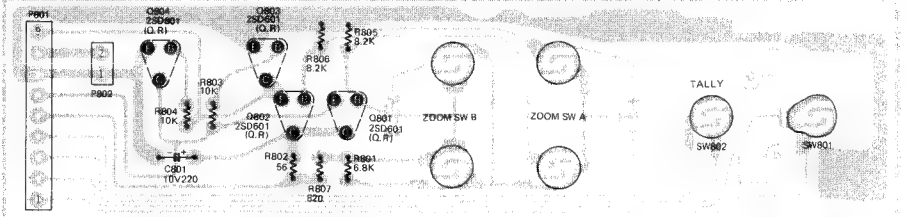
AUDIO CIRCUIT BOARD (VEPW0262)



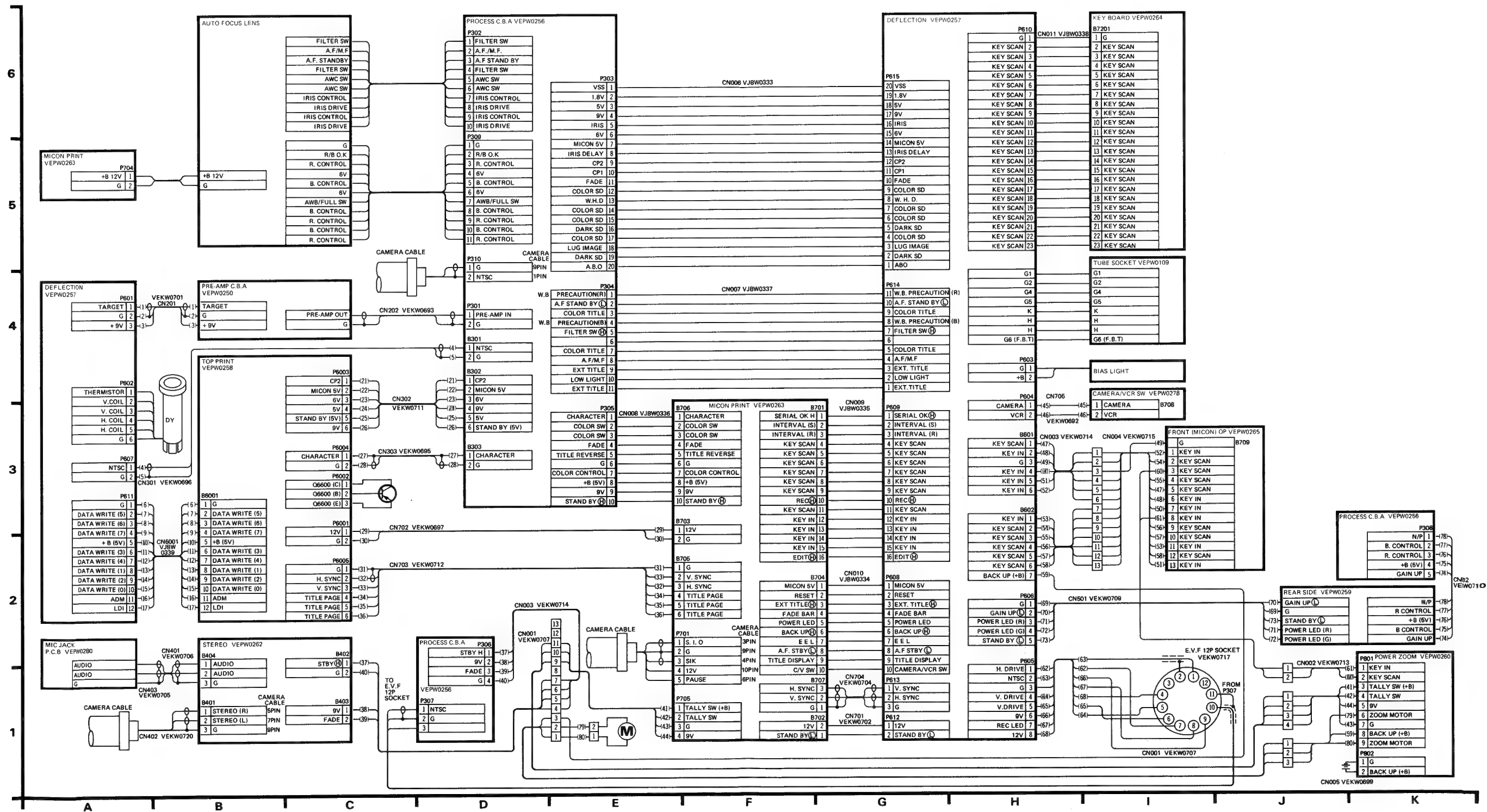
POWER ZOOM SW SCHEMATIC DIAGRAM



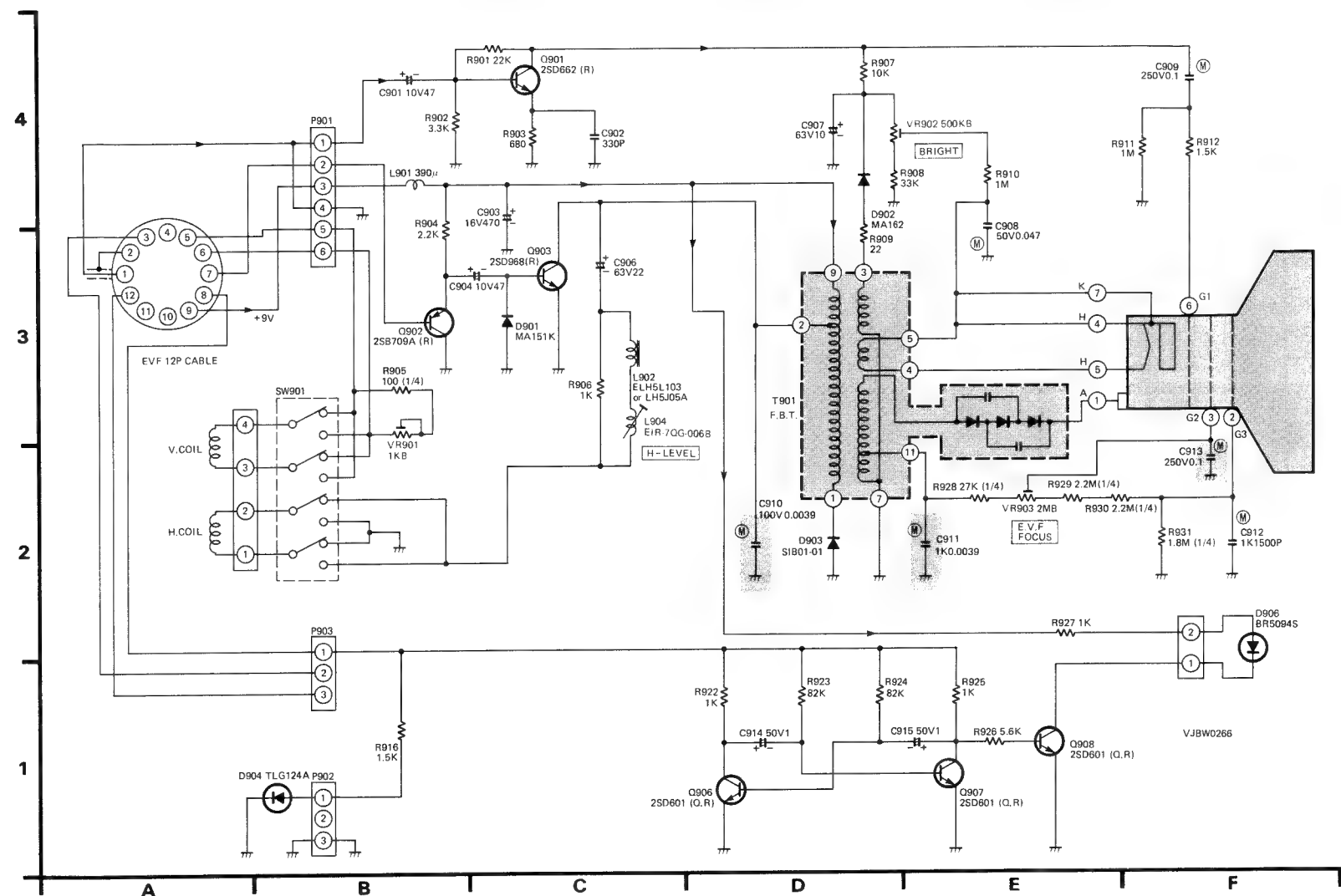
POWER ZOOM SW CIRCUIT BOARD (VEPW0260)



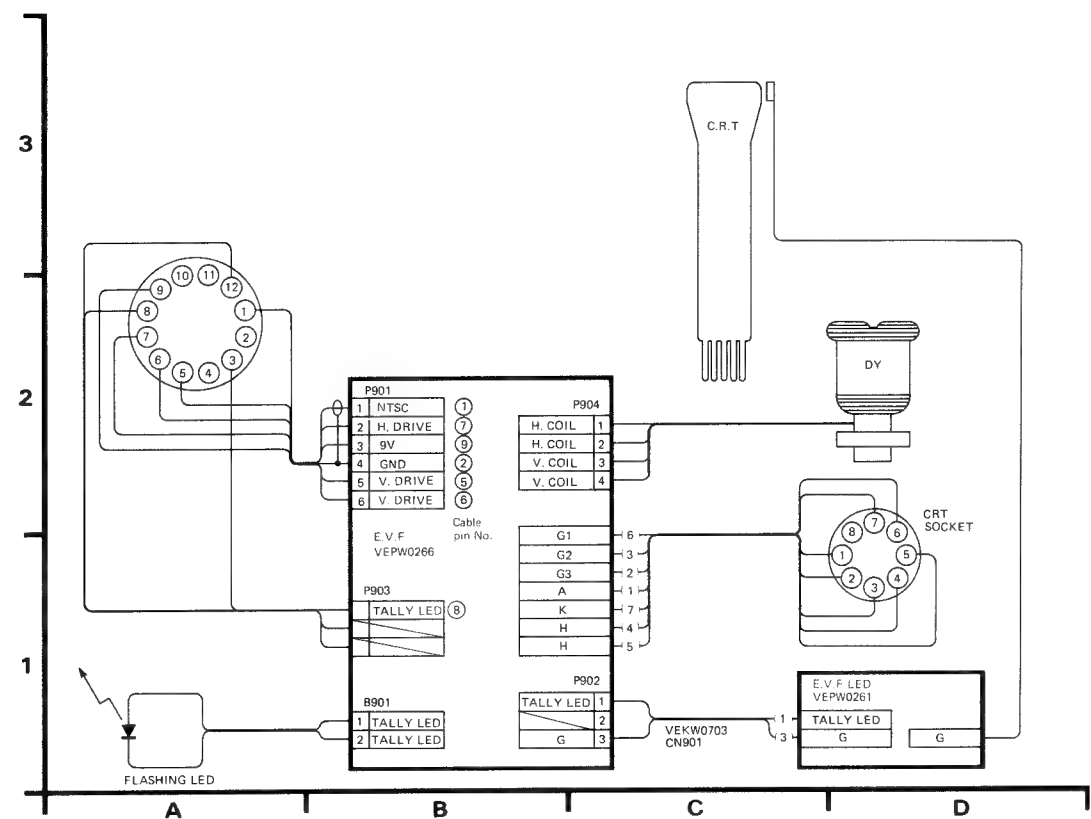
CAMERA UNIT INTERCONNECTION SCHEMATIC DIAGRAM



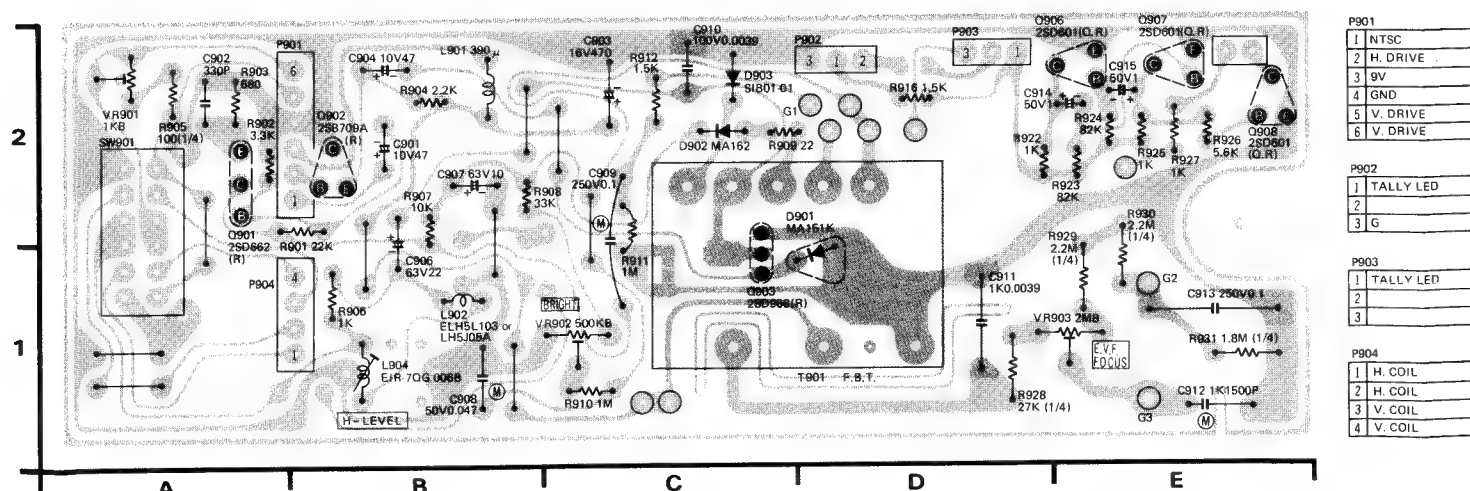
ELECTRONIC VIEWFINDER SCHEMATIC DIAGRAM



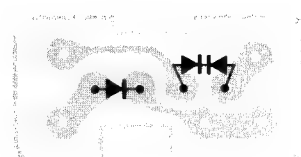
ELECTRONIC VIEWFINDER INTERCONNECTION SCHEMATIC DIAGRAM



ELECTRONIC VIEWFINDER CIRCUIT BOARD (VEPW0266)



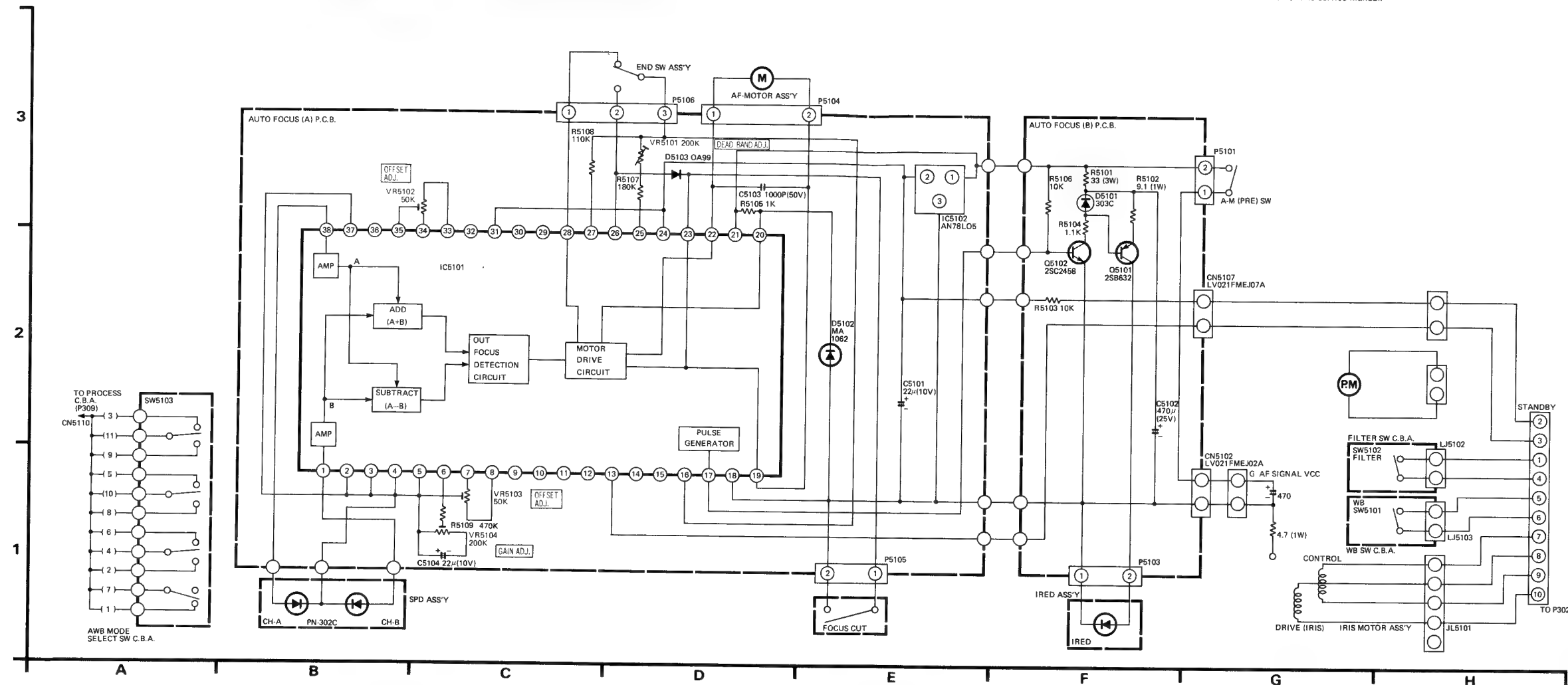
E.V.F. LED CIRCUIT BOARD (VEPW0261)



SPECIAL NOTE All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.

AUTO FOCUS SCHEMATIC DIAGRAM

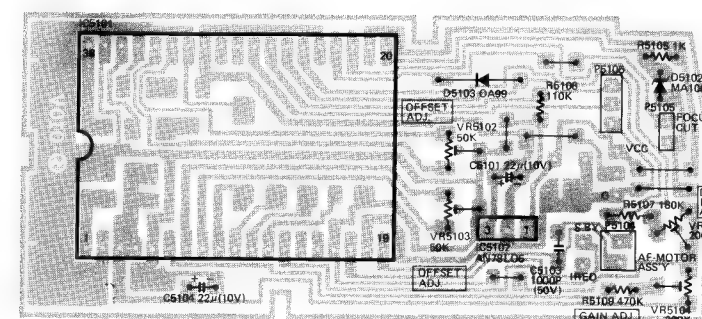
SPECIAL NOTE All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.



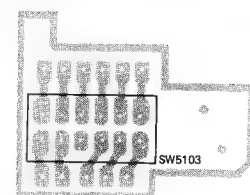
**AUTO FOCUS(A) CIRCUIT BOARD
(VEPW0361)**

**AUTO FOCUS(B) CIRCUIT BOARD
(VEPW0362)**

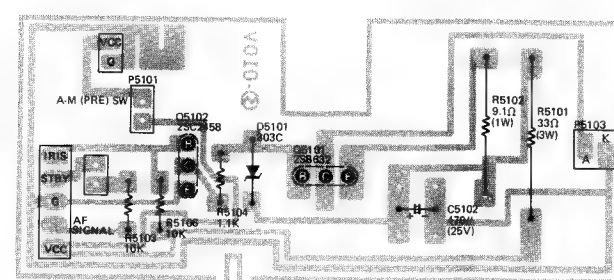
AUTO FOCUS INTERCONNECTION SCHEMATIC DIAGRAM



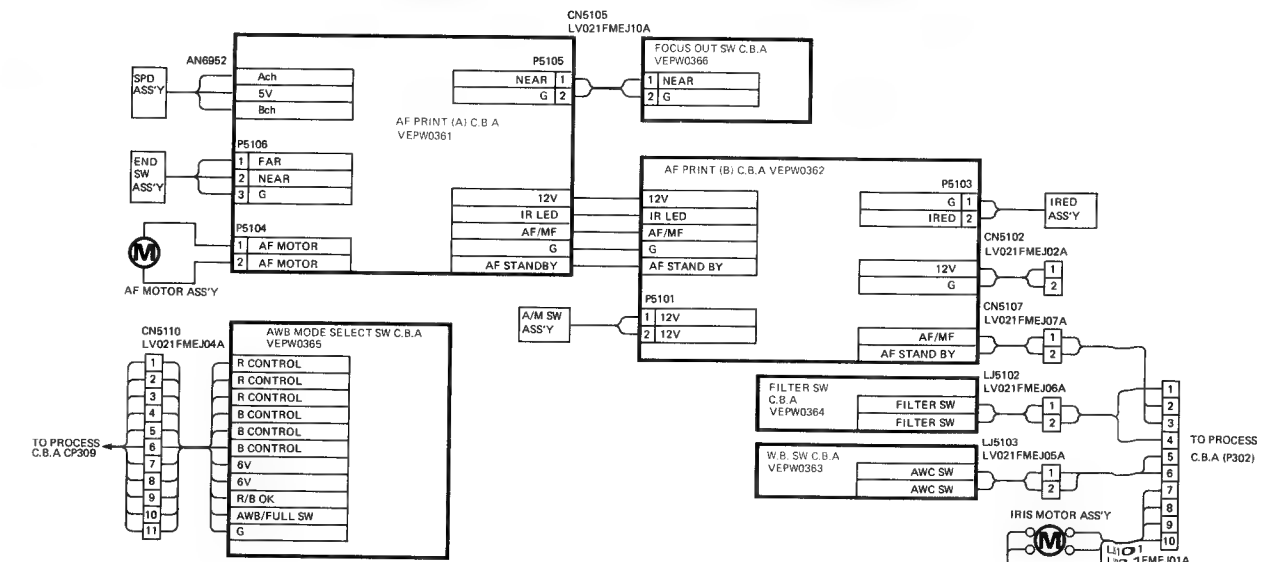
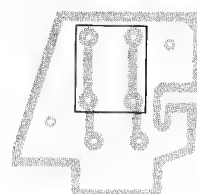
**AWB SW C.B.A.
(VEPW0365)**



**WB SW C.B.A.
(VEPW0363)**



**FOCUS OUT SW
C.B.A. (VEPW0366)**



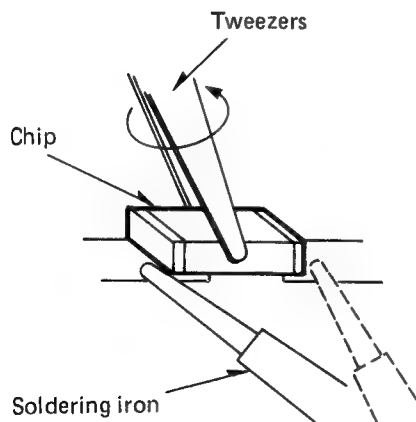
Chip Components

A. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF before replacing the chip.
2. Use tweezers to handle the chip to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of the chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron be used.
7. Solder with diameter of less than 0.5mm is recommended.
8. Do not heat the chip from more than 3 seconds.
9. Maintain the temperature under 260°C (500°F) when soldering.

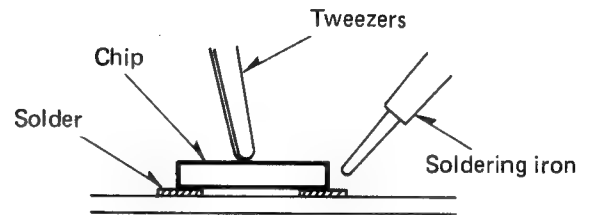
B. Removal

1. Add solder to both ends of the chip (three leads on the chip transistor).
 2. Holding the soldering iron to both ends of the chip (the three leads on the chip transistor) as shown below and remove the chip by turning it with the tweezers.
- Note: Be careful not to damage the other chips.

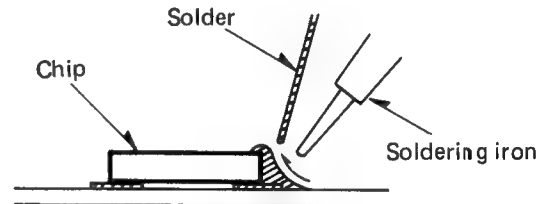


C. Mounting

1. Apply the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.



3. Solder both ends of the chip (three leads on the chip transistor).



Panasonic[®]
MATSUSHITA ELECTRIC

Service Manual

Color Video Camera

PK-958

Vol. 5

Exploded Views Replacement Parts List


PK-958

SPECIFICATIONS

Power Source: DC 12V \pm 10%
AC 120V \pm 10%, 60Hz \pm 0.5%
(with Power Supply Unit)

Power Consumption: DC 6.6W at 12V DC (Battery)
(with E.V.F.) (6W with Auto Focus off)
DC 2.0W at standby

Newvicon Tube
System: 2/3" frequency separation single tube system (built in stripe filter)

Single Carrier
Frequency: 5 MHz

Focus System: Electro-static type

Lens Mounting: Built in zoom lens (not "C" mount)

Lens: 8:1 zoom lens with auto/manual iris control
Power zoom lens (2 speed) and macro construction
F: 1.4, f: 11 mm ~ 88 mm
d: 1.0m to infinity

Lens Diameter: 58mm

Light Sensitivity: Minimum light intensity on optical image: 7 lux (F: 1.4)
Optimum light intensity on optical image: 900 lux

Video Output Level: 1.0Vp-p, 75 Ω (Standard NTSC signal)

Sync. System: Internal Sync.: RS-170

Signal to Noise Ratio: More than 45dB

Horizontal Resolution: 300 lines

Color Temperature

Control: 2 step switch (indoor/outdoor) & Auto adjust

Microphone: Stereo microphone

Audio Output Level: -20dB, Hi-impedance

Audio Output

Impedance: High impedance (1 K Ω)

External Microphone

Input Impedance: 600 Ω unbalanced

(Left, Right)

Electronic Viewfinder: Monochrome 1 inch CRT

Operating

Temperature: 5°C to 40°C

Operating Humidity: 10% to 75%

Operating Position: Nomal position and Gain up position

Weight: Camera Head with E.V.F.
5.5 lbs (with lens, 7 ft cable & shoulder pad/handle grip)
AC adaptor (option)
2.4 lbs

Dimensions:

Camera Head with E.V.F.
8.4"(W) \times 7.7"(H) \times 16.4"(D)
210mm(W) \times 192mm(H) \times 409mm(D)
AC adaptor (option)
3"(W) \times 3"(H) \times 6"(D)
79mm(W) \times 75mm(H) \times 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

Panasonic Company
Division of Matsushita Electric
Corporation of America
One Panasonic Way, Secaucus,
New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhū St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Panasonic Canada
Division of Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infantería, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

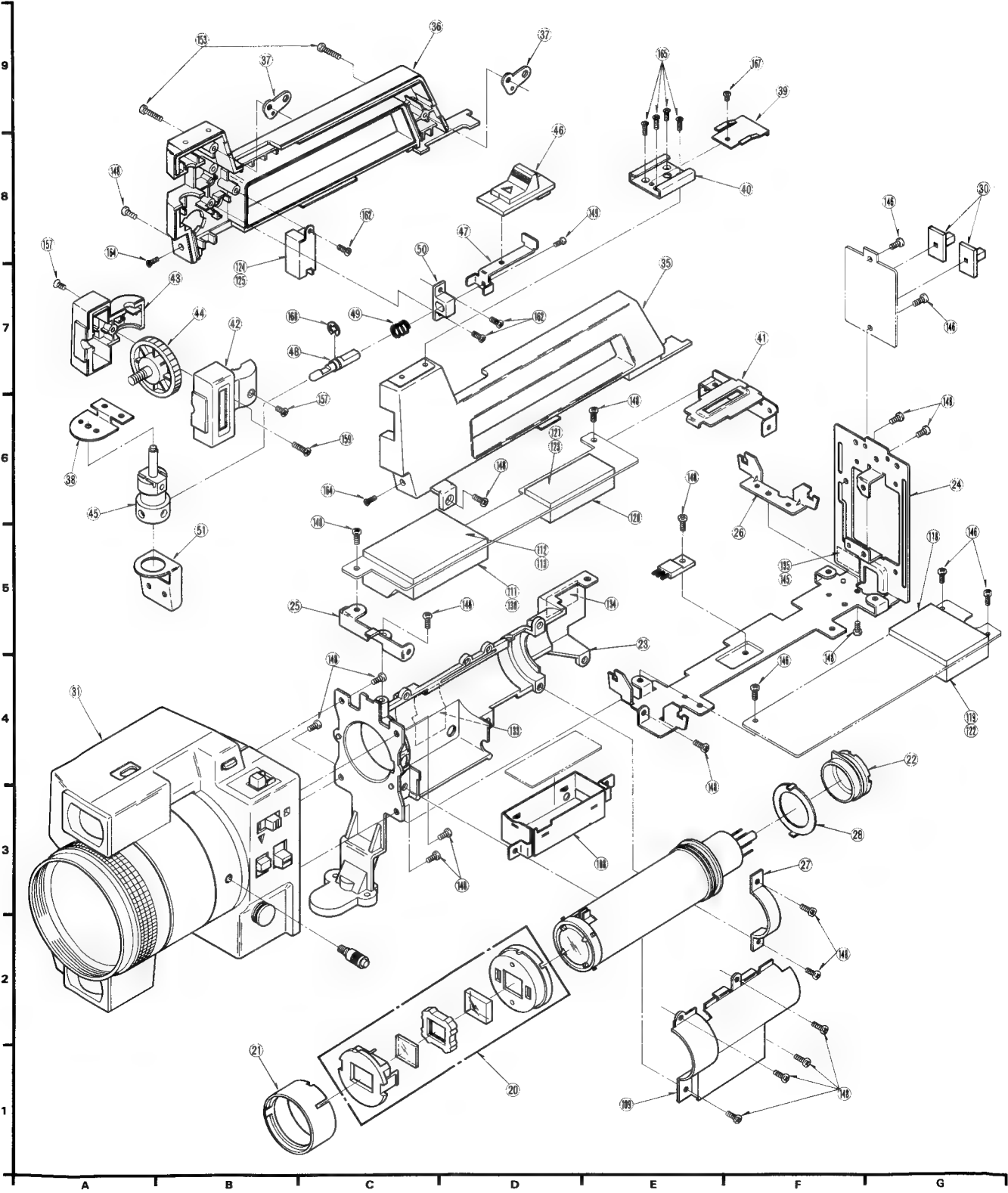
CONTENTS

EXPLODED VIEWS (Camera Head)

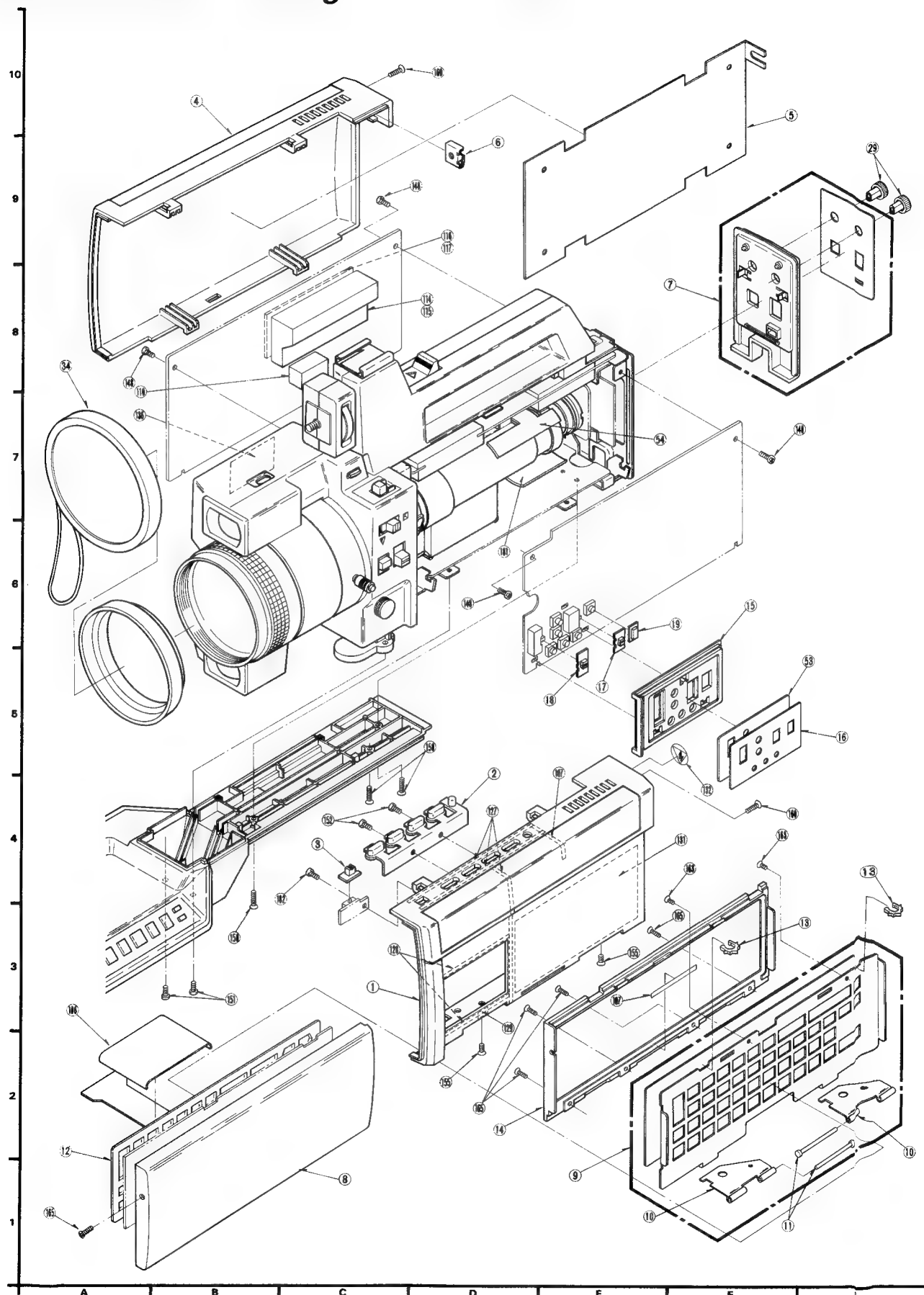
1. Camera Unit Section	5-1
2. Camera Unit Casing Parts Section	5-2
3. Shoulder Grip Unit Section	5-3
4. Electronic Viewfinder Section	5-4
5. Packing Parts Section	5-5
6. Auto Focus Lens Unit Section	5-6
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EXPLODED VIEW

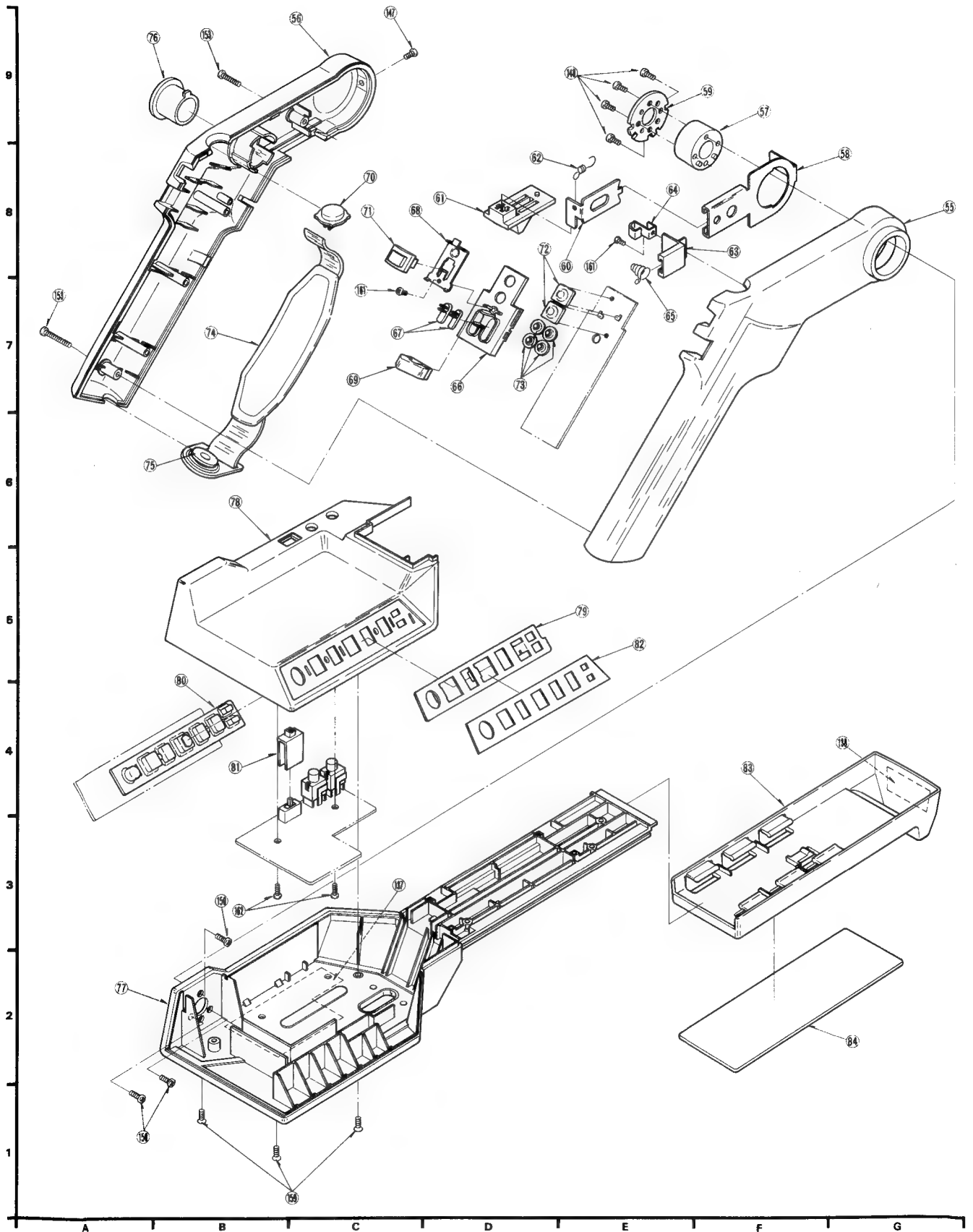
1 Camera Unit Section



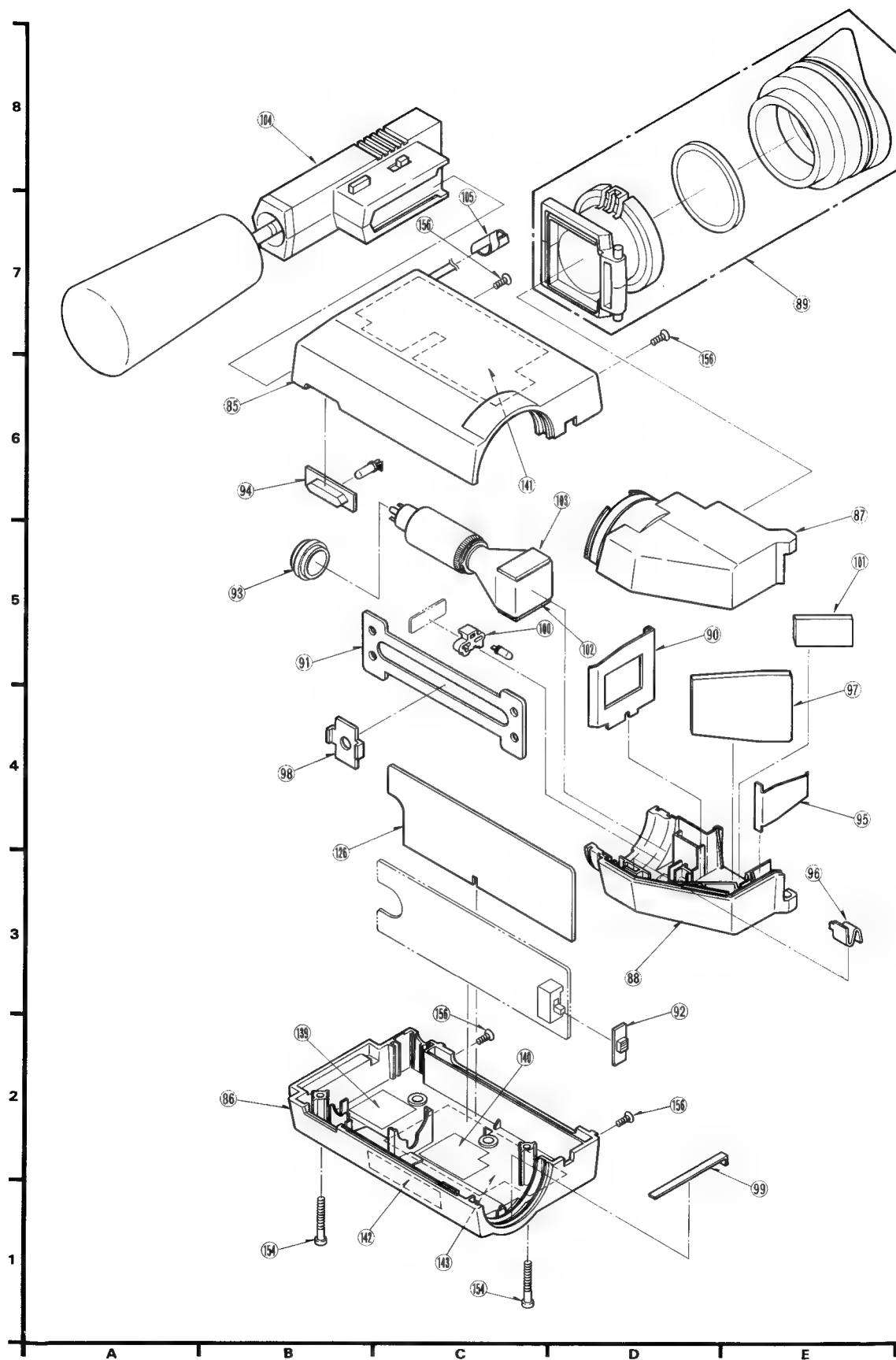
2 Camera Unit Casing Parts Section



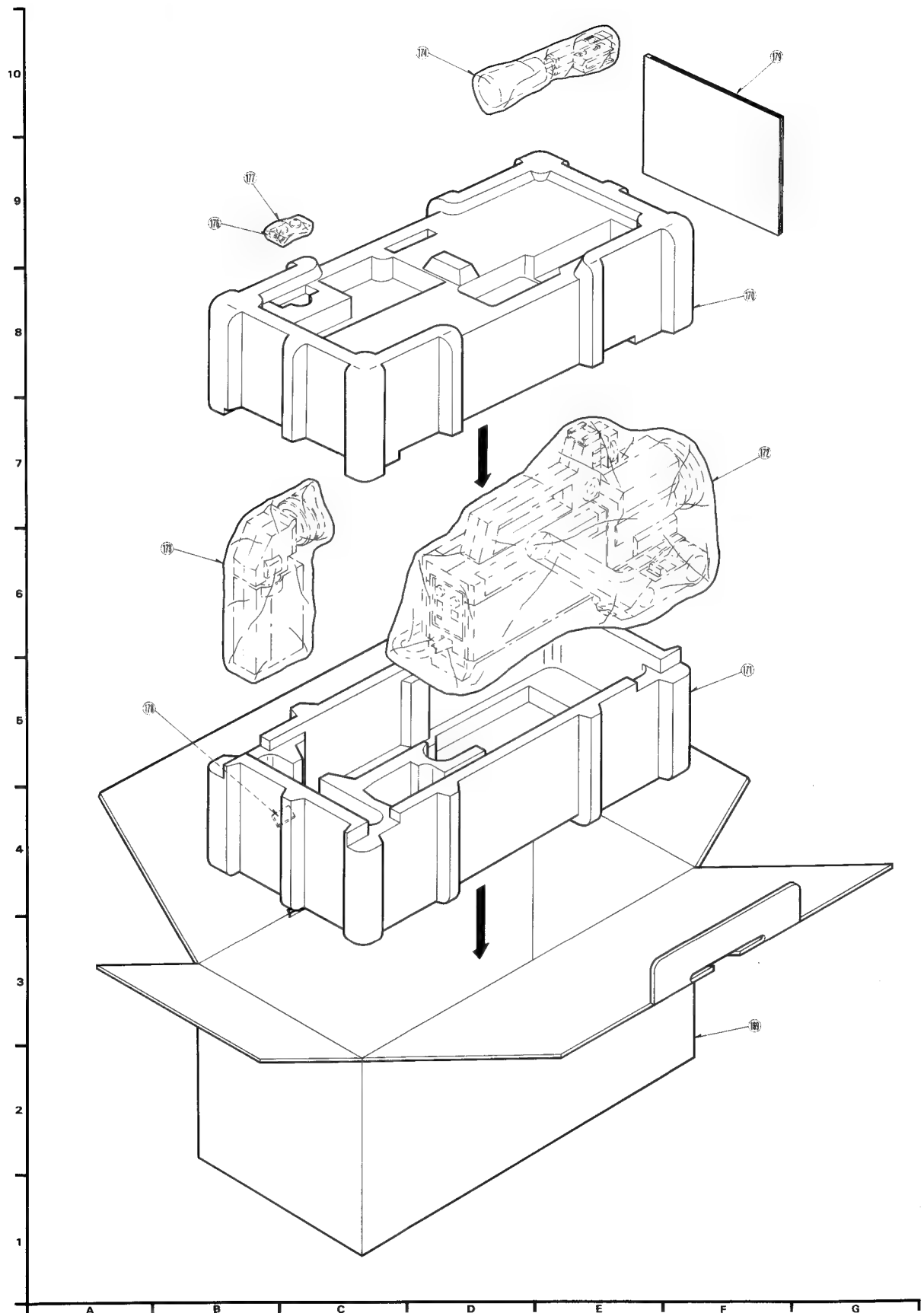
3 Shoulder Grip Unit Section



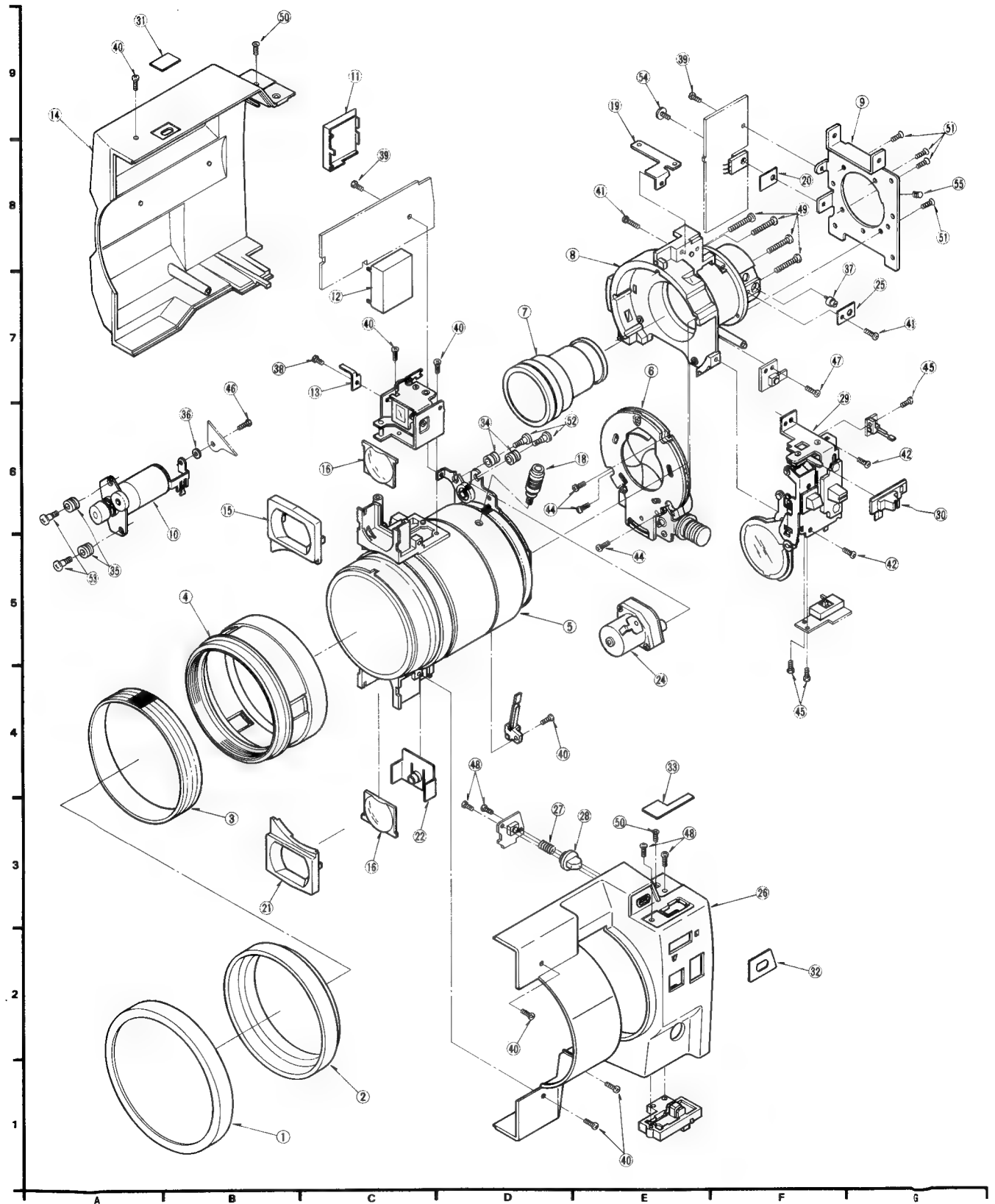
4 Electronic Viewfinder Section



5 Packing Parts Section



6 Auto Focus Lens Unit Section



Mechanical Replacement Parts List

Note: *Be sure to make your orders of replacement parts according to this list

- Available replacement part
 × Not Available as replacement
 □ Only available on special order

Item No.	Drawing No.	Description	Pcs/ Set	Availability	Part No.	Remark
		C.S.U				
1	2	SIDE COVER (R) ASS'Y	1		VYKW0555	
2	2	VCR PUSH BUTTON	1		VGW0093	
3	2	CAMERA/VCR SELECTION KNOB	1		VGW0094	
4	2	SIDE COVER (L) ASS'Y	1		VYKW0556	
5	2	BARRIER (L)	1		VMZW0146	
6	2	GROUND PLATE	1		VMBW0033	
7	2	BACK COVER ASS'Y	1		VYKW0563	
8	2	SIDE DOOR ASS'Y	1		VYKW0566	
9	2	HINGE PANEL ASS'Y	1		VXAW0040	
10	2	HINGE ANGLE	2		VMAW0186	
11	2	HINGE PIN	2		VMSW0042	
12	2	RUBBER SWITCH	1		VMGW0054	
13	2	DOOR CLIP PIECE	2		VKEW0008	
14	2	FRAME	1		VKGW0511	
15	2	SWITCH CASE	1			
16	2	SWITCH PANEL	1		VGW0278	
17	2	TITLE SELECTION KNOB	1		VGW0095	
18	2	TIMER SELECTION KNOB	1		VGW0096	
19	2	PUSH BUTTON	1		VGW0097	
20	1	FILTER ASS'Y	1		VKEW0022	
21	1	FILTER RING	1		VMDW0028	
22	1	N.V. BIAS LIGHT HOLDER	1		VMDW0042	
23	1	MAIN CHASSIS	1		VMKW0043	
24	1	SUB CHASSIS	1		VMAW0191	
25	1	P.C.B. FIXING PLATE	1		VMAW0189	
26	1	P.C.B. ANGLE	1		VMAW0190	
27	1	DY BAND	1		VMAW0098-1	
28	1	DY SPRING	1		VMBW0023-1	
29	2	R/B VOLUME KNOB	2		VGW0106	
30	1	STANDBY SW KNOB	2		VGW0107	
31	1	X8 AUTO FOCUS LENS	1		VFLW0069	
34	2	HOOD CAP ASS'Y	1		VXJW0006	
35	1	TOP HANDLE (R)	1		VKGW0435	
36	1	TOP HANDLE (L)	1		VKGW0436	
37	1	STRAP HOLDER	2		VMAW0181	
38	1	SHOE FIXING ANGLE (A)	1		VMAW0224	
39	1	SHOE PRESSING SPRING	1		VMBW0031	
40	1	SHOE	1		VMAW0156	
41	1	HANDLE ANGLE	1		VMAW0188	
42	1	E.V.F. MOVEABLE CASE (R)	1		VKGW0433	
43	1	E.V.F. MOVEABLE CASE (L)	1		VKGW0434	
44	1	E.V.F. KNOB	1		VGW0033	
45	1	SUPPORT	1		VMSW0041	
46	1	LOCK KNOB	1		VGW0105	
47	1	LOCK FIXING ANGLE	1		VMAW0184	
48	1	LOCK PIN	1		VMSW0039	
49	1	LOCK SPRING	1		VMBW0057	
50	1	LOCK ANGLE	1		VMSW0040	
51	1	SUPPORT FIXING ANGLE (B)	1		VMAW0183	
53	2	ESD SHIELD PLATE	1		VSCW0155	
54	2	DY BARRIER ASS'Y	1		VXEW0027	
(181)	2	CHASSIS BARRIER ASS'Y	1		VXEW0030	
		REMO. CON. SHOULDER				
55	3	GRIP (R)	1		VKHW0049	
56	3	GRIP (L)	1		VKHW0050	
57	3	CRUTCH (A)	1		VMDW0054	
58	3	CRUTCH STOPPER	1		VMAW0193	
59	3	CRUTCH (B)	1		VMVW0012	
60	3	CRUTCH LEVER	1		VMAW0192	
61	3	LOCK KNOB	1		VGW0105	
62	3	LOCK SPRING	1		VMBW0055	

Item No.	Drawing No.	Description	Pcs/ Set	Availability	Part No.	Remark
63	3	SELL TERMINAL HOLDER	1		VGW0110	
64	3	SELL TERMINAL (+)	1		VMBW0053	
65	3	SELL TERMINAL (-)	1		VMBW0054	
66	3	POWER ZOOM BUTTON HOLDER	1		VGW0114	
67	3	JOINT LEVER	2		VGW0115	
68	3	ESD SPRING	1		VMBW0056	
69	3	POWER ZOOM BUTTON	1		VGW0113	
70	3	REC/REV BUTTON	1		VGW0112	
71	3	TALLY BUTTON	1		VGW0111	
72	3	RUBBER SWITCH (B)	2		VMGW0053	
73	3	RUBBER SWITCH (C)	4		VMGW0063	
74	3	HAND STRAP	1		VFBW0015	
75	3	STRAP HOLDER	1		VKGW0356	
76	3	SELL CAP	1		VXHW0052	
77	3	BOTTOM CASE	1		VKGW0437	
78	3	BOTTOM COVER	1		VKGW0438	
79	3	ESD PLATE	1		VSCW0108	
80	3	MI. COM. RUBBER SWITCH	1		VMGW0055	
81	3	AUDIO SELECTION KNOB	1		VGW0109	
82	3	OPERATION PANEL	1		VGW0282	
83	3	SHOULDER SLIDE	1		VKGW0439	
84	3	SHOULDER PAD	1		VMFW0037	
		SIDE E.V.F.				
85	4	E.V.F. TOP COVER	1		VKGW0428	
86	4	E.V.F. BOTTOM COVER	1		VKGW0429	
87	4	CRT CASE (A)	1		VKGW0430	
88	4	CRT CASE (B)	1		VKGW0431	
89	4	E.V.F. DOOR ASS'Y	1		VYKW0532	
90	4	CRT PROTECTION COVER	1		VMAW0180	
91	4	CASE FIXING ANGLE	1		VMAW0179	
92	4	R/L CHANGE KNOB	1		VGW0098	
93	4	CRT FIXING BUSH	1		VMGW0016	
94	4	TALLY DIFFUSION PIECE	1		VGW0019	
95	4	E.V.F. SPRING	1		VMBW0043	
96	4	GROUND SPRING	1		VMAW0204	
97	4	E.V.F. MIRROR	1		VMRW0004	
98	4	E.V.F. MOVEABLE ANGLE	1		VMAW0094	
99	4	E.V.F. ROTATION SPRING	1		VMBW0036	
100	4	LED SPACER	1		VMKW0065	
101	4	MIRROR CUSHION	1		VMGW0066	
102	4	CRT CUSHION (II)	1		VMGW0031	
103	4	CRT CUSHION (III)	1		VMGW0032	
104	4	MIC KIT	1		VXW00032	
105	4	SPIRAL TUBE	1		VKBW0010	
		CASE				
106	2	FLEXIBLE PROTECTION SHEET	1		VMZW0142	
107	2	ESD SHEET A	1		VMZW0145	
108	1	PRE-AMP SHIELD CASE	1		VSCW0107	
109	1	PRE-AMP SHIELD COVER	1		VSCW0106-1	
110	2	DL SHIELD PLATE	1		VSCW0123	
111	1	AVR SHIELD CASE (A)	1		VSCW0115	
112	1	AVR SHIELD CASE (B)	1		VSCW0116	
113	1	AVR SHIELD BARRIER	1		VMZW0123	
114	2	SYNC BARRIER	1		VMZW0127	
115	2	SYNC SHIELD CASE (A)	1		VSCW0121	
116	2	SYNC SHIELD PLATE	1		VSCW0122	
117	2	SYNC INSULATION SHEET	1		VMZW0125	
118	1	MI. COM. SHIELD CASE (A)	1		VSCW0117	
119	1	MI. COM. SHIELD CASE (B)	1		VSCW0118	
120	1	MI. COM. SHIELD CASE (C)	1		VSCW0119	
121	1	MI. COM. SHIELD CASE (D)	1		VSCW0120	
		MI. COM. INSULATION				
122	1	SHEET (A)	1		VMZW0124	
		MI. COM. INSULATION				
123	1	SHEET (B)	1		VMZW0128	
124	1	MIC JACK SHIELD CASE	1		VSCW0114	
125	1	JACK BARRIER	1		VMZW0126	
126	4	E.V.F. BARRIER	1		VMZW0121	

Item No.	Drawing No.	Description	Pcs/ Set	Availability	Part No.	Remark
127	2	ESD SHEET B	3		VMZW0159	
128	2	ESD SHEET C	2		VMZW0160	
129	2	ESD BARRIER D	1		VMZW0107	
130	1	AVR BARRIER	1		VMZW0156	
		LABEL				
131	2	DESCRIPTION LABEL	1		VQLW0654	
132	2	CAUTION LABEL (E)	1		VQLW0629	
133	1	CAUTION LABEL D	1		VQLW0633	
134	1	CHASSIS LABEL	1		VQLW0074	
135	1	TARGET INDICATION LABEL	1		VQLW0615-1 ~	
					VQLW0627-1	
136	2	AUTO FOCUS LENS LABEL	1		VQLW0650	
137	3	CAUTION LABEL (B)	1		VQLW0637	
138	3	CAUTION LABEL	1		VQLW0364	
139	4	CRT PIN INDICATION LABEL	1		VQLW0652	
140	4	HIGH VOLTAGE CAUTION LABEL	1		VQLW0631	
141	4	WARNING LABEL	1		VQLW0630	
142	4	CAUTION LABEL	1		VQLW0400	
143	4	E.V.F. CAUTION LABEL	1		VQLW0639	
145	1	TARGET INDICATION LABEL	1		VQLW0750 ~	
					VQLW0755	
		SCREW				
		BINDING HEAD MACHINE				
146	1	SCREWS M2.6x4	5		XSB26+4FU	
147	3	M2.6x5	1		XSB26+5FXK	
148	1,3,2	M2.6x6	28		XSB26+6FU	
149	1	M2x4	1		XSB2+4FU	
150	3	M3x6	3		XSB3+6FU	
151	2	M3x6	2		XSB3+6FXK	
		BINDING HEAD TAPPING				
152	2	SCREWS M2.6x5	2		XTB26+5GUFU	
153	1,3	M2.6x18	4		XTB26+18GFXK	
154	4	M2.6x20	2		XTB26+20GFXK	
(182)	2	M2.6x8	1		XTB26+8GUFU	
		FLUSH HEAD MACHINE SCREWS				
155	2	M2.6x4	2		XSS26+4FU	
157	1	M2.6x5	2		XSS26+5FXK	
158	2	M2.6x12	3		XSS26+12FXK	
156	4	M2.6x4	4		XSS26+4FXK	
159	1,3	M2.6x10	4		XTS26+10GFXK	
		OVAL COUNTERSUNK HEAD				
160	2	MACHINE SCREWS M2.6x10	2		XSC26+10FXK	
		PAN HEAD TAPPING SCREWS				
161	3	M2x6	2		XTN2+6GUFU	
162	1,3	M2.6x6	5		XTN26+6GUFU	
		PRECISION MINI-SCREWS				
163	2	M2x4	2		XQS2+A4FC	
164	1	M2x5	2		XQS2+A5FXK	
165	1,2	M2x6.8	9		XQS2+A68FXK	
		PAN HEAD PRECISION MINI-				
167	1	SCREWS M2x1.5	1		XQN2+A15FTW	
168	1	E RING	1		XUC4FY	
		PACKING CASE				
169	5	PACKING CASE	1		VPKW0403	
170	5	CUSHION TOP	1		VPGW0101	
171	5	CUSHION BOTTOM	1		VPGW0102	
172	5	POLY BAG FOR CAMERA HEAD	1		XZB31X70A02	
173	5	POLY BAG FOR E.V.F.	1		XZB17X45A02	
174	5	POLY BAG FOR MIC KIT	1		XZB9.5X40A02	
176	5	STRAP ANGLE	2		VFBW0016	
		POLY BAG FOR STRAP ANGLE				
177	5	(UNIPACK)	1		85x60 (mm)	
178	5	HANDLE	1		VPGW0004	
179	5	FAN BAG KIT	1		VQFW0168	
181	2	CHASSIS BARRIER ASS'Y	1		VXFW0030	
		BINDING HEAD TAPPING				
182	2	SCREWS M2.6x8	1		XTB26+8GUFU	

Electrical Replacement Parts List

Note:

- Be sure to make your orders of replacement parts according to this list.
- IMPORTANT! SAFETY NOTICE
Components identified by shade have special characteristics important for safety. When replacing any of these components, use only the original ones.
- Unless otherwise specified:
All resistors are in OHMS (Ω), 1/8w, 5% carbon, K=1,000, M=1,000K Ω .
All capacitors are in MICROFARADS (μ F), 10%, P= μ F.
All coils are in MICROHENRIES (μ H), m= 10^3 .
- C.B.A: Circuit Board Assembly.
- C.B: Circuit Board

SPECIAL NOTE All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
	VEPW0250	PRE-AMP C.B.A.	1	
	VEPW0256	PROCESS C.B.A.	1	
	VEPW0275	YL FILTER C.B.A.	1	
	VEPW0276	COLOR TITLE C.B.A.	1	
	VEPW0277	MATRIX C.B.A.	1	
	VEPW0283	COLOR ERROR COMPENSATION C.B.A.	1	
	VEPW0257	DEFLECTION C.B.A.	1	
	VEPW0321	VERTICAL DEFLECTION C.B.A.	1	
	VEPW0263	MI. COM. PRINT C.B.A.	1	
	VEPW0258	A.V.R. C.B.A.	1	
	VEPW0109C	TUBE SOCKET C.B.A.	1	
	VEPW0259	REAR SIDE C.B.A.	1	
	VEPW0262	AUDIO C.B.A.	1	
	VEPW0260	POWER ZOOM SW C.B.A.	1	
	VEPW0264	KEY BOARD C.B.A.	1	
	VEPW0265	MI. COM. SW C.B.A.	1	
	VEPW0278	VCR/CAMERA SW C.B.A.	1	
	VEPW0280	MIC JACK C.B.A.	1	
	VEPW0266	E.V.F. C.B.A.	1	
	VEPW0261	E.V.F. LED C.B.A.	1	
	VEPW0250	PRE-AMP C.B.A.		
		Transistors		
Q201	2SK321(Q)		1	
Q202	2SA1022(B)	Chip	1	
Q203	2SC2404(C)	Chip	1	
Q204,205	2SA1022(B)	Chip	2	
Q206	2SD601(R)	Chip	1	
		Diode		
D201	MA165		1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		Resistors		
R201	ERD25TJ565	Resistor 1/4W 5.6M	1	
R202	ERJ6GCVJ511M	Chip 510	1	
R203	ERO25CKG2704	2.7M	1	
R204	ERJ6GCVJ181M	Chip 180	1	
R205	ERJ6GCVJ682M	Chip 6.8K	1	
R206	ERJ6GCVJ222M	Chip 2.2K	1	
R207	ERJ6GCVJ241M	Chip 240	1	
R208	ERDS2TJ273	Resistor 1/4W 27K	1	
R209	ERDS2TJ222	Resistor 1/4W 2.2K	1	
R210	ERDS2TJ161	Resistor 1/4W 160	1	
R211	ERJ6GCVJ104M	Chip 100K	1	
R212	ERDS2TJ152	Resistor 1/4W 1.5K	1	
R213	ERJ6GCVJ124M	Chip 120K	1	
R214	ERJ6GCVJ682M	Chip 6.8K	1	
R215	ERJ6GCVJ623M	Chip 62K	1	
R216	ERJ6GCVJ122M	Chip 1.2K	1	
R217	ERJ6GCVJ332M	Chip 3.3K	1	
R218	ERJ6GCVJ750M	Chip 75	1	
		Capacitors		
C201,202	ECUM1E104ZFM	Chip Ceramic 25V 0.1	2	
C203	ECEA1AF470	Electrolytic 10V 47	1	
C204	ECCFIH020CC5	Ceramic 50V 2P	1	
C205	ECQE1104KN	Mylar 100V 0.1	1	
C206	ECEA0JKS470	Electrolytic 6.3V 47	1	
C207,208	ECSFOJE106	Tantalum 6.3V 10	2	
C209	ECUM1E104ZFM	Chip Ceramic 25V 0.1	1	
C210	ECSF1AE475	Tantalum 10V 4.7	1	
C211	ECCFIH070DC5	Ceramic 50V 7P	1	
C212	EGR-GB050M11	Trimmer 50P	1	
C213	ECCFIH220JC	Ceramic 50V 22P	1	
		Coils		
L201	ELT12R012	Percival Coil 210μH	1	
L202	EL040SSR100K	10μH	1	
		Miscellaneous		
CN201	VEKW0701	3P Connector Ass'y	1	
CN202	VEKW0693	2P Connector Ass'y	1	
		PROCESS C.B.A.		
		Integrated Circuits		
IC301	AN2133		1	
IC302	AN2141		1	
IC303	NJM2904M		1	
IC304	AN2210S		1	
IC305	AN2331		1	
IC306	NW6064RS		1	
IC307	AN2431		1	
IC308	NW8029		1	
IC309	NW6172		1	
IC310	NJM2904M		1	
IC311	AN2340		1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
IC312	AN2341		1	
IC313	NJM2904M		1	
		LC Filters		
LC301	ELB4H009		1	
LC302	ELB4M010		1	
LC303	ELB4K011		1	
LC304,305	ELB4H010		2	
		Delay Lines		
DL301	EFDMT645C45E		1	
DL302	ELB4K013		1	
DL303	EFDVN645B15C		1	
		Crystals		
X301	VSXW0011		1	
		Diodes		
D301	MA151K	Chip	1	
D302	MA27W-A		1	
D303-306	MA165		4	
D307	1SV73		1	
D309	MA151K	Chip	1	
D310	MA165		1	
D311	MA27A		1	
D312	MA165		1	
D313,314	0A90AR		2	
D315,316	MA151K	Chip	2	
D317-319	MA165		3	
D320,321	MA151K	Chip	2	
D322	MZ303A		1	
		Transistors		
Q301	2SD601(Q,R)	Chip	1	
Q302,303	2SB709(Q,R)	Chip	2	
Q304	2SD601(Q,R)	Chip	1	
Q305	2SB641(Q,R)		1	
Q306	2SD601(Q,R)	Chip	1	
Q307	2SD636(Q,R)		1	
Q308	2SB709(Q,R)	Chip	1	
Q309	2SD601(Q,R)	Chip	1	
Q310	2SB709(Q,R)	Chip	1	
Q311	2SD601(Q,R)	Chip	1	
Q312	2SD636(Q,R)		1	
Q313	2SD601(Q,R)	Chip	1	
Q314	2SD603(Q,R)		1	
Q315,316	2SB709(Q,R)	Chip	2	
Q317	2SD636(Q,R)		1	
Q318	2SD601(Q,R)	Chip	1	
Q319-321	2SD636(Q,R)		3	
Q322-324	2SD601(Q,R)	Chip	3	
Q325	2SD636(Q,R)		1	
Q326-333	2SD601(Q,R)	Chip	8	
Q334	2SB709(Q,R)	Chip	1	
Q335-338	2SD601(Q,R)	Chip	4	
		Resistors		
R301	ERJ6GCVJ470M	Chip	47	1

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R302	ERJ6GCVJ223M	Chip	22K 1	
R303	ERJ6GCVJ563M	Chip	56K 1	
R304	ERJ6GCVJ102M	Chip	1K 1	
R305	ERJ6GCVJ472M	Chip	4.7K 1	
R306	ERJ6GCVJ333M	Chip	33K 1	
R307	ERJ6GCVJ563M	Chip	56K 1	
R308	ERJ6GCVJ821M	Chip	820 1	
R309	ERJ6GCVJ332M	Chip	3.3K 1	
R310	ERJ6GCVJ152M	Chip	1.5K 1	
R311	ERJ6GCVJ153M	Chip	15K 1	
R312	ERJ6GCVJ563M	Chip	56K 1	
R313	ERJ6GCVJ391M	Chip	390 1	
R314	ERJ6GCVJ562M	Chip	5.6K 1	
R315	ERTD2PHL332S	Thermistor	3.3K 1	
R316	ERJ6GCVJ102M	Chip	1K 1	
R317	ERJ6GCVJ122M	Chip	1.2K 1	
R318	ERJ6GCVJ222M	Chip	2.2K 1	
R319	ERJ6GCVJ104M	Chip	100K 1	
R320	ERJ6GCVJ123M	Chip	12K 1	
R321	ERJ6GCVJ472M	Chip	4.7K 1	
R322	ERJ6GCVJ102M	Chip	1K 1	
R323	ERJ6GCVJ103M	Chip	10K 1	
R324	ERJ6GCVJ222M	Chip	2.2K 1	
R325	ERJ6GCVJ272M	Chip	2.7K 1	
R326	ERJ6GCVJ222M	Chip	2.2K 1	
R327	ERJ6GCVJ153M	Chip	15K 1	
R328	ERJ6GCVJ224M	Chip	220K 1	
R329	ERJ6GCVJ184M	Chip	180K 1	
R330	ERJ6GCVJ104M	Chip	100K 1	
R331,332	ERJ6GCVJ103M	Chip	10K 2	
R333	ERJ6GCVJ122M	Chip	1.2K 1	
R334	ERJ6GCVJ682M	Chip	6.8K 1	
R335	ERJ6GCVJ102M	Chip	1K 1	
R336	ERJ6GCVJ472M	Chip	4.7K 1	
R337,338	ERJ6GCVJ103M	Chip	10K 2	
R339,340	ERJ6GCVJ103M	Chip	10K 2	
R341	ERJ6GCVJ153M	Chip	15K 1	
R342	ERJ6GCVJ182M	Chip	1.8K 1	
R343,344	ERJ6GCVJ103M	Chip	10K 2	
R345	ERJ6GCVJ823M	Chip	82K 1	
R346	ERJ6GCVJ103M	Chip	10K 1	
R347	ERJ6GCVJ334M	Chip	330K 1	
R348	ERJ6GCVJ103M	Chip	10K 1	
R349	ERJ6GCVJ102M	Chip	1K 1	
R350	ERJ6GCVJ122M	Chip	1.2K 1	
R351	ERJ6GCVJ331M	Chip	330 1	
R352	ERJ6GCVJ102M	Chip	1K 1	
R353,354	ERJ6GCVJ563M	Chip	56K 2	
R356	ERJ6GCVJ222M	Chip	2.2K 1	
R357	ERJ6GCVJ103M	Chip	10K 1	
R358	ERJ6GCVJ684M	Chip	680K 1	
R359	ERJ6GCVJ561M	Chip	560 1	
R360	ERJ6GCVJ563M	Chip	56K 1	
R361	ERJ6GCVJ561M	Chip	560 1	
R362	ERJ6GCVJ100M	Chip	10 1	
R363	ERJ6GCVJ103M	Chip	10K 1	
R364	ERJ6GCVJ123M	Chip	12K 1	
R365	ERJ6GCVJ392M	Chip	3.9K 1	
R366	ERJ6GCVJ153M	Chip	15K 1	
R367	ERJ6GCVJ562M	Chip	5.6K 1	
R368,369	ERJ6GCVJ222M	Chip	2.2K 2	
R370	ERJ6GCVJ223M	Chip	22K 1	
R371	ERJ6GCVJ683M	Chip	68K 1	
R372	ERJ6GCVJ472M	Chip	4.7K 1	
R373,374	ERJ6GCVJ152M	Chip	1.5K 2	
R375	ERTD2PHL503S	Thermistor	50K 1	
R376	ERJ6GCVJ153M	Chip	15K 1	
R377	ERJ6GCVJ473M	Chip	47K 1	
R378,379	ERJ6GCVJ103M	Chip	10K 2	
R380-387	ERJ6GCVJ154M	Chip	150K 8	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R388,389	ERJ6GCVJ103M	Chip	10K 2	
R390-392	ERJ6GCVJ153M	Chip	15K 3	
R393	ERJ6GCVJ473M	Chip	47K 1	
R394-396	ERJ6GCVJ153M	Chip	15K 3	
R397	ERJ6GCVJ473M	Chip	47K 1	
R398	ERJ6GCVJ103M	Chip	10K 1	
R399	ERJ6GCVJ100M	Chip	10 1	
R3100	ERJ6GCVJ822M	Chip	8.2K 1	
R3101,3102	ERJ6GCVJ103M	Chip	10K 2	
R3103	ERJ6GCVJ223M	Chip	22K 1	
R3104	ERJ6GCVJ103M	Chip	10K 1	
R3105	ERJ6GCVJ221M	Chip	220 1	
R3106	ERJ6GCVJ822M	Chip	8.2K 1	
R3107,3108	ERJ6GCVJ103M	Chip	10K 2	
R3109	ERJ6GCVJ822M	Chip	8.2K 1	
R3110	ERJ6GCVJ392M	Chip	3.9K 1	
R3111	ERJ6GCVJ822M	Chip	8.2K 1	
R3112	ERJ6GCVJ182M	Chip	1.8K 1	
R3113	ERJ6GCVJ822M	Chip	8.2K 1	
R3114,3115	ERJ6GCVJ682M	Chip	6.8K 2	
R3116	ERJ6GCVJ103M	Chip	10K 1	
R3117	ERJ6GCVJ473M	Chip	47K 1	
R3118	ERJ6GCVJ472M	Chip	4.7K 1	
R3119	ERJ6GCVJ103M	Chip	10K 1	
R3120	ERJ6GCVJ223M	Chip	22K 1	
R3121	ERJ6GCVJ433M	Chip	43K 1	
R3122	ERJ6GCVJ561M	Chip	560 1	
R3123	ERJ6GCVJ683M	Chip	68K 1	
R3124	ERJ6GCVJ333M	Chip	33K 1	
R3125	ERJ6GCVJ153M	Chip	15K 1	
R3126	ERJ6GCVJ182M	Chip	1.8K 1	
R3127	ERJ6GCVJ222M	Chip	2.2K 1	
R3128	ERJ6GCVJ561M	Chip	560 1	
R3129	ERJ6GCVJ272M	Chip	2.7K 1	
R3130,3131	ERJ6GCVJ562M	Chip	5.6K 2	
R3132	ERJ6GCVJ103M	Chip	10K 1	
R3133	ERJ6GCVJ560M	Chip	56 1	
R3134	ERJ6GCVJ102M	Chip	1K 1	
R3135	ERJ6GCVJ222M	Chip	2.2K 1	
R3136	ERJ6GCVJ271M	Chip	270 1	
R3137	ERJ6GCVJ222M	Chip	2.2K 1	
R3138	ERJ6GCVJ122M	Chip	1.2K 1	
R3139	ERJ6GCVJ223M	Chip	22K 1	
R3140	ERJ6GCVJ183M	Chip	18K 1	
R3141	ERJ6GCVJ824M	Chip	820K 1	
R3142	ERJ6GCVJ183M	Chip	18K 1	
R3143	ERJ6GCVJ824M	Chip	820K 1	
R3144	ERJ6GCVJ223M	Chip	22K 1	
R3145	ERJ6GCVJ333M	Chip	33K 1	
R3146	ERJ6GCVJ152M	Chip	1.5K 1	
R3147	ERJ6GCVJ272M	Chip	2.7K 1	
R3148	ERJ6GCVJ562M	Chip	5.6K 1	
R3149,3150	ERJ6GCVJ102M	Chip	1K 2	
R3151	ERJ6GCVJ103M	Chip	10K 1	
R3152	ERJ6GCVJ332M	Chip	3.3K 1	
R3153	ERJ6GCVJ103M	Chip	10K 1	
R3154	ERJ6GCVJ332M	Chip	3.3K 1	
R3155	ERJ6GCVJ222M	Chip	2.2K 1	
R3156	ERJ6GCVJ223M	Chip	22K 1	
R3157	ERJ6GCVJ473M	Chip	47K 1	
R3158	ERJ6GCVJ223M	Chip	22K 1	
R3159	ERJ6GCVJ473M	Chip	47K 1	
R3160,3161	ERJ6GCVJ103M	Chip	10K 2	
R3163,3164	ERJ6GCVJ103M	Chip	10K 2	
R3165,3166	ERJ6GCVJ153M	Chip	15K 2	
R3167	ERJ6GCVJ102M	Chip	1K 1	
R3168,3169	ERJ6GCVJ154M	Chip	150K 2	
R3170	ERJ6GCVJ223M	Chip	22K 1	
R3171,3172	ERJ6GCVJ103M	Chip	10K 2	
R3173	ERJ6GCVJ473M	Chip	47K 1	

Ref. No.	Part No.	Part Name & Description	Pos / Set	Remarks
		Resistors		
R3238	ERJ6GCVJ472M	Chip 4.7K	1	
R3239	ERJ6GCVJ223M	Chip 22K	1	
R3240	ERJ6GCVJ102M	Chip 1K	1	
R3241	ERJ6GCVJ562M	Chip 5.6K	1	
R3242	ERJ6GCVJ152M	Chip 1.5K	1	
R3243	ERJ6GCVJ563M	Chip 56K	1	
R3244	ERJ6GCVJ223M	Chip 22K	1	
R3245	ERJ6GCVJ152M	Chip 1.5K	1	
R3246	ERJ6GCVJ472M	Chip 4.7K	1	
R3247	ERJ6GCVJ562M	Chip 5.6K	1	
R3248	ERJ6GCVJ152M	Chip 1.5K	1	
R3249	ERJ6GCVJ563M	Chip 56K	1	
R3250	ERJ6GCVJ223M	Chip 22K	1	
R3251	ERJ6GCVJ103M	Chip 10K	1	
R3252	ERJ6GCVJ472M	Chip 4.7K	1	
R3253	ERJ6GCVJ223M	Chip 22K	1	
R3254	ERJ6GCVJ222M	Chip 2.2K	1	
R3255	ERJ6GCVJ103M	Chip 10K	1	
R3256	ERJ6GCVJ102M	Chip 1K	1	
R3257	ERJ6GCVJ472M	Chip 4.7K	1	
R3258	ERJ6GCVJ562M	Chip 5.6K	1	
R3259,3260	ERJ6GCVJ223M	Chip 22K	2	
R3261	ERJ6GCVJ472M	Chip 4.7K	1	
R3262	ERJ6GCVJ562M	Chip 5.6K	1	
R3263	ERJ6GCVJ103M	Chip 10K	1	
		Capacitors		
C3119	ECUM1H101JN	Chip Ceramic 50V 100P	1	
C3120	ECUM1H220JN	Chip Ceramic 50V 22P	1	
C3121	ECUM1H102KBN	Chip Ceramic 50V 1000P	1	
C3122	ECUM1H103KBN	Chip Ceramic 50V 10000P	1	
C3123	ECUM1H560JN	Chip Ceramic 50V 56P	1	
C3124	ECUM1H103KBN	Chip Ceramic 50V 10000P	1	
C3125	ECUM1H102KBN	Chip Ceramic 50V 1000P	1	
C3126	ECUM1H103KBN	Chip Ceramic 50V 10000P	1	
C3127	ECUM1H473ZFN	Chip Ceramic 50V 47000P	1	
	VEPW0277	MATRIX C.B.A.		
		Transistors		
Q349-352	2SB709(Q,R)	Chip	4	
		Resistors		
R3264	ERJ6GCVJ682M	Chip 6.8K	1	
R3265	ERJ6GCVJ391M	Chip 390	1	
R3266	ERJ6GCVJ682M	Chip 6.8K	1	
R3267	ERJ6GCVJ222M	Chip 2.2K	1	
R3268	ERJ6GCVJ393M	Chip 39K	1	
R3269	ERJ6GCVJ332M	Chip 3.3K	1	
R3270	ERJ6GCVJ103M	Chip 10K	1	
R3271	ERJ6GCVJ102M	Chip 1K	1	
R3272	ERJ6GCVJ183M	Chip 18K	1	
R3273	ERJ6GCVJ472M	Chip 4.7K	1	
R3274	ERJ6GCVJ681M	Chip 680	1	
R3275	ERJ6GCVJ331M	Chip 330	1	

Ref. No.	Part No.	Part Name & Description	Pos / Set	Remarks
	VEPW0283	COLOR ERROR COMPENSATION C.B.A.		
		Transistor		
Q339	2SB709(Q,R)	Chip	1	
		Diodes		
D323,324	0A90AR		2	
		Resistors		
R3230,3231	ERJ6GCVJ105M	Chip 1M	2	
R3232	ERJ6GCVJ273M	Chip 27K	1	
R3233	ERJ6GCVJ222M	Chip 2.2K	1	
R3234	ERJ6GCVJ104M	Chip 100K	1	
R3235	ERJ6GCVJ104M	Chip 100K	1	
R3236	ERJ6GCVJ822M	Chip 8.2K	1	
R3237	ERJ6GCVJ104M	Chip 100K	1	
		Capacitors		
C3117,3118	ECEA1HKS47	Electrolytic 50V 0.47	2	
	VEPW0257	DEFLECTION C.B.A.		
		Integrated Circuits		
IC601	NJM3415M		1	
IC602	UPD7508G-607		1	
IC603	AN2510S		1	
IC604,605	AN90B82S		2	
IC606	AN90B82S		1	
IC607	HM6116LFF-4		1	
		Diodes		
D601	MA171A		1	
D602	MA151K	Chip	1	
D603	ERR28-04D		1	
D604	MA151K	Chip	1	
D605-607	MA151K	Chip	3	
D608	1S954		1	
D609	MA151K	Chip	1	
D610	MA165		1	
D611	0A90AR		1	
		Transistors		
Q601	2SB788(R)		1	
Q602,603	2SD601(Q,R)	Chip	2	
Q604	2SB709(Q,R)	Chip	1	
Q605	2SC1565A		1	
Q606,607	2SA1018(Q,R)		2	
Q608	2SD973A		1	
Q609	2SB709(Q,R)	Chip	1	
Q610,611	2SB709(Q,R)	Chip	2	

Ref. No.	Part No.	Part Name & Description	Pwr Set	Remarks
Q612	2SD601(Q,R)	Chip	1	
Q613	2SD669A		1	
Q614	2SD601(Q,R)	Chip	1	
Q615	2SD662(Q,R)		1	
Q616	2SD601(Q,R)	Chip	1	
Q617	2SA1018(Q,R)		1	
Q622	2SA1018(Q,R)		1	
Q623	2SD662(Q,R)		1	
Q624	2SB709(Q,R)	Chip	1	
Q625	2SD601(Q,R)	Chip	1	
Q626	2SB709(Q,R)	Chip	1	
Q627-629	2SD601(Q,R)	Chip	3	
Q630,631	2SB709(Q,R)	Chip	2	
Q632	2SD601(Q,R)	Chip	1	
		Resistors		
R601	ERJ6GCVJ103M	Chip 10K	1	
R602	EROS2CKP5603	Chip 1/4W 560K	1	
R603	ERJ6GCVJ823M	Chip 82K	1	
R604	ERJ6GCVJ624M	Chip 620K	1	
R605	ERJ6GCVJ393M	Chip 39K	1	
R606	ERJ6GCVJ472M	Chip 4.7K	1	
R607,608	ERJ6GCVJ331M	Chip 330	2	
R609	ERJ6GCVJ683M	Chip 68K	1	
R610	ERJ6GCVJ104M	Chip 100K	1	
R611	ERJ6GCVJ153M	Chip 15K	1	
R612,613	ERJ6GCVJ472M	Chip 4.7K	2	
R614	ERJ8GCVJ334W	Chip 330K	1	
R615	ERJ8GCVJ223W	Chip 22K	1	
R616	ERJ8GCVJ123W	Chip 12K	1	
R617	ERJ8GCVJ562W	Chip 5.6K	1	
R618	ERJ8GCVJ102W	Chip 1K	1	
R620	ERJ6GCVJ332M	Chip 3.3K	1	
R621	ERJ8GCVJ224W	Chip 220K	1	
R622	ERJ6GCVJ101M	Chip 100	1	
R623	ERJ6GCVJ472M	Chip 4.7K	1	
R624	ERJ6GCVJ104M	Chip 100K	1	
R625	ERJ6GCVJ333M	Chip 33K	1	
R626,627	ERJ6GCVJ563M	Chip 56K	2	
R628	ERJ6GCVJ223M	Chip 22K	1	
R629	ERJ6GCVJ152M	Chip 1.5K	1	
R630	ERJ6GCVJ102M	Chip 1K	1	
R631	ERJ6GCVJ222M	Chip 2.2K	1	
R632	ERJ6GCVJ682M	Chip 6.8K	1	
R633,634	ERJ6GCVJ103M	Chip 10K	2	
R635	ERJ6GCVJ273M	Chip 27K	1	
R636	ERJ6GCVJ103M	Chip 10K	1	
R637	ERJ6GCVJ332M	Chip 3.3K	1	
R638	ERJ6GCVJ472M	Chip 4.7K	1	
R639	ERJ6GCVJ153M	Chip 15K	1	
R640	ERJ6GCVJ562M	Chip 5.6K	1	
R641	ERJ6GCVJ221M	Chip 220	1	
R642	ERJ6GCVJ102M	Chip 1K	1	
R643	ERJ6GCVJ151M	Chip 150	1	
R644	ERJ6GCVJ180M	Chip 18	1	
R645	ERJ6GCVJ274M	Chip 270K	1	
R646	ERJ6GCVJ332M	Chip 3.3K	1	
R647	ERJ6GCVJ152M	Chip 1.5K	1	
R648	ERJ6GCVJ221M	Chip 220	1	
R649	ERJ6GCVJ181M	Chip 180	1	
R650	ERJ6GCVJ221M	Chip 220	1	
R651,652	ERJ6GCVJ103M	Chip 10K	2	
R653	ERJ6GCVJ472M	Chip 4.7K	1	
R657	ERJ6GCVJ104M	Chip 100K	1	
R658	ERJ6GCVJ472M	Chip 4.7K	1	
R660	ERJ6GCVJ223M	Chip 22K	1	
R663	ERJ6GCVJ333M	Chip 33K	1	
R664	ERJ6GCVJ184M	Chip 180K	1	

Ref. No.	Part No.	Part Name & Description	Pwr Set	Remarks
R665	ERJ6GCVJ223M	Chip 22K	1	
R666	ERJ6GCVJ562M	Chip 5.6K	1	
R667	ERJ6GCVJ153M	Chip 15K	1	
R668	ERJ6GCVJ152M	Chip 1.5K	1	
R669	ERJ6GCVJ563M	Chip 56K	1	
R670	ERJ6GCVJ153M	Chip 15K	1	
R671	ERJ6GCVJ563M	Chip 56K	1	
R672	ERJ6GCVJ470M	Chip 47	1	
R673	ERJ6GCVJ102M	Chip 1K	1	
R674	ERJ6GCVJ622M	Chip 6.2K	1	
R675	ERJ6GCVJ623M	Chip 62K	1	
R676	ERJ6GCVJ222M	Chip 2.2K	1	
R677	ERJ6GCVJ561M	Chip 560	1	
R678	ERJ6GCVJ223M	Chip 22K	1	
R680	ERJ6GCVJ103M	Chip 10K	1	
R681	ERJ6GCVJ487M	Chip 4.7	1	
R682	ERJ6GCVJ512M	Chip 5.1K	1	
R683-687	ERJ6GCVJ563M	Chip 56K	5	
R688	ERJ6GCVJ564M	Chip 560K	1	
R689	ERJ6GCVJ563M	Chip 56K	1	
R690	ERJ6GCVJ123M	Chip 12K	1	
R691,692	ERJ6GCVJ224M	Chip 220K	2	
R693	ERJ6GCVJ104M	Chip 100K	1	
R694	ERJ6GCVJ683M	Chip 68K	1	
R695	ERJ6GCVJ563M	Chip 56K	1	
R696	ERJ6GCVJ223M	Chip 22K	1	
R697	ERJ6GCVJ104M	Chip 100K	1	
R698	ERJ6GCVJ472M	Chip 4.7K	1	
R699	ERJ6GCVJ103M	Chip 10K	1	
R6100	ERJ6GCVJ682M	Chip 6.8K	1	
R6101	ERJ6GCVJ563M	Chip 56K	1	
R6102	ERJ6GCVJ220M	Chip 22	1	
R6103	ERJ6GCVJ562M	Chip 5.6K	1	
R6104	ERJ6GCVJ0R00	Chip 0	1	
R6105	ERJ6GCVJ472M	Chip 4.7K	1	
R6106	ERJ6GCVJ102M	Chip 1K	1	
R6107-6112	ERJ6GCVJ563M	Chip 56K	6	
R6118,6119	ERJ6GCVJ563M	Chip 56K	2	
R6120	ERDS2TJ563	Resistor 1/4W 56K	1	
R6122	ERDS2TJ562	Resistor 1/4W 5.6K	1	
R6123	ERDS2TOT	0	1	
		Variable Resistors		
VR601	EVML4GA00B34	30KB	1	
VR602	EVML4GA00B35	300KB	1	
VR603	EVML4GA00B34	30KB	1	
VR604	EVML4GA00B16	1MB	1	
VR605	EVML4GA00B55	500KB	1	
VR606	EVML4GA00B34	30KB	1	
VR607-614	EVML4GA00B14	10KB	8	
VR615	EVML4GA00B12	10KB	1	
VR616	EVML4GA00B14	10KB	1	
VR617	EVML4GA00B23	2KB	1	
VR618	EVML4GA00B33	3KB	1	
VR619	EVML4GA00B15	100KB	1	
VR620	EVML4GA00B13	1KB	1	
VR621	EVML4GA00B15	100KB	1	
		Capacitors		
C601	ECEA1AKS470	Electrolytic 10V 47	1	
C602	ECEA1CKS100	Electrolytic 16V 10	1	
C603	ECEA1AKS330	Electrolytic 10V 33	1	
C604	ECQV1H154JZ	Mylar 50V 0.15	1	
C605	ECSF1AE476	Tantalum 10V 47	1	
C606	ECEA1CKS100	Electrolytic 16V 10	1	
C607	ECEA2AS010	Electrolytic 100V 1	1	

Ref. No.	Part No.	Part Name & Description	Pos / Set	Remarks
		Miscellaneous		
CN701	VEKW0702	2P Connector Ass'y	1	
CN702	VEKW0697	2P Connector Ass'y	1	
CN703	VEKW0712	6P Connector Ass'y	1	
CN704	VEKW0704	3P Connector Ass'y	1	
CN010	VJBW0334	F.P.C.(B)	1	
CN009	VJBW0335	F.P.C.(C)	1	
CN008	VJBW0336	F.P.C.(D)	1	
	VSCW0117	MI.COM. Shield Case (A)	1	
	VSCW0118	MI.COM. Shield Case (B)	1	
	VMZW0128	MI.COM. Insulation	1	
		Sheet (A)		
	VEPW0258	AUTOMATIC VOLTAGE REGULATOR C.B.A.		
		Integrated Circuits		
IC6001	AN6564NS		1	
IC6002	AN6558S		1	
IC6003	MB88303		1	
		Diodes		
D6001	MA165		1	
D6002	MZL306B		1	
D6003	1S954		1	
D6004-6006	MA165		3	
D6007	MA27W		1	
D6008,6009	MA165		2	
		Transistors		
Q6001	2SB709(Q,R)	Chip	1	
Q6002	2SA963A(Q,R)		1	
Q6003	2SD601(Q,R)	Chip	1	
Q6004,6005	2SD874A	Chip	2	
Q6006,6007	2SD636(Q,R)		2	
Q6008	2SD601(Q,R)	Chip	1	
		Resistors		
R6001	ERJ6GCTJ472M	Chip 4.7K	1	
R6002	ERJ6GCTJ562M	Chip 5.6K	1	
R6003	ERJ6GCTJ222M	Chip 2.2K	1	
R6004	ERJ6GCTJ562M	Chip 5.6K	1	
R6005	ERJ6GCTJ472M	Chip 4.7K	1	
R6006	ERJ6GCTJ103M	Chip 10K	1	
R6007	ERJ6GCTJ152M	Chip 1.5K	1	
R6008	ERJ6GCTJ123M	Chip 12K	1	
R6009	ERJ6GCTJ103M	Chip 10K	1	
R6010	ERJ6GCTJ223M	Chip 22K	1	
R6011	ERJ6GCTJ102M	Chip 1K	1	
R6012	ERJ6GCTJ152M	Chip 1.5K	1	
R6013	ERJ6GCTJ183M	Chip 18K	1	
R6014	ERJ6GCTJ471M	Chip 470	1	
R6015	ERJ6GCTJ103M	Chip 10K	1	
R6016	ERJ6GCTJ512M	Chip 5.1K	1	
R6017	ERJ6GCTJ102M	Chip 1K	1	
R6018	ERJ6GCTJ222M	Chip 2.2K	1	
R6019	ERJ6GCTJ562M	Chip 5.6K	1	
R6020	ERJ6GCTJ103M	Chip 10K	1	
R6021	ERJ6GCTJ562M	Chip 5.6K	1	
R6022	ERJ6GCTJ103M	Chip 10K	1	
R6023	ERJ6GCTJ564M	Chip 560K	1	
R6024,6025	ERJ6GCTJ103M	Chip 10K	2	
R6026	ERJ6GCTJ912M	Chip 9.1K	1	

Ref. No.	Part No.	Part Name & Description	Pos / Set	Remarks
R6027	ERJ6GCTJ472M	Chip 4.7K	1	
R6028	ERJ6GCTJ153M	Chip 15K	1	
R6029	ERJ6GCTJ154M	Chip 150K	1	
R6030	ERJ6GCTJ182M	Chip 1.8K	1	
R6031	ERJ6GCTJ103M	Chip 10K	1	
R6032	ERJ6GCTJ222M	Chip 2.2K	1	
R6033	ERTD2PHL802S	Thermistor 8K	1	
R6034	ERJ6GCTJ563M	Chip 56K	1	
		Variable Resistors		
VR6001	EVML4GA00B13	1KB	1	
VR6002	VRVW0005	2.2KB	1	
		Capacitors		
C6001	ECEA1ESS101	Electrolytic 25V 100	1	
C6002	ECEA0JSS471	Electrolytic 6.3V 470	1	
C6003	ECEA1AK101	Electrolytic 10V 100	1	
C6004	ECEA1CKS100	Electrolytic 16V 10	1	
C6005	ECEA0JKS101	Electrolytic 6.3V 100	1	
C6006	ECEA0JK221	Electrolytic 6.3V 220	1	
C6007	ECEA1ESS101	Electrolytic 25V 100	1	
C6008	ECEA1AKS470	Electrolytic 10V 47	1	
C6009	ECUM1H222KBN	Chip Ceramic 50V 2200P	1	
C6010	ECEA1CKS100	Electrolytic 16V 10	1	
C6011	ECUM1H561KN	Chip Ceramic 50V 560P	1	
C6012	ECEA0JK221	Electrolytic 6.3V 220	1	
C6013	ECCF1H101J	Ceramic 50V 100P	1	
C6014	ECEA0JK221X	Electrolytic 6.3V 220	1	
C6015	ECEA0JKS220	Electrolytic 6.3V 22	1	
C6016	ECEA1ASS221	Electrolytic 10V 220	1	
		Coils		
L6001	ELC08G003	50ΩH	1	
L6002	ELC09J001	670ΩH	1	
L6003	ELC08G003	50ΩH	1	
L6004	VLQ7R101K	100ΩH	1	
		Short Plugs		
P6001	VJPW0002	2P	1	
P6002	VJPW0003	3P	1	
P6003	VJPW0006	6P	1	
P6004	VJPW0002	2P	1	
P6005	VJPW0006	6P	1	
		Miscellaneous		
CN6001	VJBW0339	F.P.C. (G)	1	
	VSCW0115	AVR Shield Case (A)	1	
	VSCW0116	AVR Shield Case (B)	1	
	VMZW0123	AVR Shield Barrier	1	
	VSCW0119	MI.COM. Shield Case (C)	1	
	VSCW0120	MI.COM. Shield Case (D)	1	
	VMZW0128	MI.COM. Insulation	1	
		Sheet (B)		
	VEKW0830	Lug Terminal Ass'y	1	
	VEPW0109C	TUBE SOCKET C.B.A.		

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		Resistor		
R619	ERDS2TJ105	Resistor 14/W 1M	1	
		Capacitor		
C621	ECQE16682N67	Mylar 1600V0.0068	1	
		Miscellaneous		
	VJSK1116	Tube Socket	1	
		REAR SIDE C.B.A.		
		Variable Resistors		
VR501,502	VRVW0001	R.B. Volume	2	
		Switches		
SW501	VSSW0025	NEGA/POSI SW	1	
SW502	VSSW0021	Standby SW	1	
		Diodes		
D501	TLSC208	Power Lamp	1	
		Miscellaneous		
CN501	VEKW0709-1	2P Connector Ass'y	1	
CN502	VEKW0710	5P Connector Ass'y	1	
CN503	VEKW0775	2P Connector Ass'y	1	
		AUDIO C.B.A.		
		Integrated Circuit		
IC401	AN6558S		1	
		Transistors		
Q401	2SD601(R)	Chip	1	
Q402,403	2SC2405S	Chip	2	
Q404	2SD601(R)		1	
Q405	2SC2405S	Chip	1	
		Diodes		
D401,402	0A90AR		2	
D403	MT27T-A		1	
D404,405	0A90AR		2	
D406	MT27T-A		1	
		Resistors		
R401	ERJ6GJYJ472M	Chip 4.7K	1	
R402	ERJ6GJYJ560M	Chip 56	1	
R403,404	ERJ6GJYJ104M	Chip 100K	2	
R405	ERJ6GJYJ101M	Chip 100	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R406	ERJ6GJYJ104M	Chip 100K	1	
R407	ERJ6GJYJ681M	Chip 680	1	
R408	ERJ6GJYJ274M	Chip 270K	1	
R409	ERJ6GJYJ103M	Chip 10K	1	
R410	ERJ6GJYJ272M	Chip 2.7K	1	
R411	ERJ6GJYJ103M	Chip 10K	1	
R412	ERJ6GJYJ271M	Chip 270	1	
R413	ERJ6GJYJ471M	Chip 470	1	
R414	ERJ6GJYJ682M	Chip 6.8K	1	
R415	ERJ6GJYJ393M	Chip 39K	1	
R416	ERJ6GJYJ103M	Chip 10K	1	
R417,418	ERJ6GJYJ104M	Chip 100K	2	
R419	ERJ6GJYJ274M	Chip 270K	1	
R420	ERJ6GJYJ681M	Chip 680	1	
R421	ERJ6GJYJ101M	Chip 100	1	
R422	ERJ6GJYJ104M	Chip 100K	1	
R423	ERJ6GJYJ103M	Chip 10K	1	
R424	ERJ6GJYJ272M	Chip 2.7K	1	
R425	ERJ6GJYJ560M	Chip 56	1	
R426,427	ERJ6GJYJ272M	Chip 2.7K	2	
R428,429	ERJ6GJYJ102M	Chip 1K	2	
R430,431	ERJ6GJYJ681M	Chip 680	2	
R432,433	ERJ6GJYJ102M	Chip 1K	2	
R434	ERJ6GJYJ152M	Chip 1.5K	1	
R436	ERJ6GJYR000	Chip 0	1	
		Capacitors		
C401	ECEA1CKS100	Electrolytic 16V 10	1	
C402	ECEA1HKN010	Electrolytic 50V 1	1	
C403,404	ECEA1HKS010	Electrolytic 50V 1	2	
C405	ECEA0JKS470	Electrolytic 6.3V 47	1	
C406	ECEA1HKS2R2	Electrolytic 50V 2.2	1	
C407	ECEA1ASS221	Electrolytic 10V 220	1	
C408	ECEA1AKS470	Electrolytic 10V 47	1	
C409	ECEA1CKS220	Electrolytic 16V 22	1	
C410	ECEA0JKS101	Electrolytic 6.3V 100	1	
C411,412	ECUM1H680KN	Chip Ceramic 50V 68P	2	
C413	ECEA1HKS010	Electrolytic 50V 1	1	
C414	ECEA1HKS2R2	Electrolytic 50V 2.2	1	
C415	ECEA1HKS010	Electrolytic 50V 1	1	
C416	ECEA0JKS470	Electrolytic 6.3V 47	1	
C417	ECEA1HKN010	Electrolytic 50V 1	1	
C418	ECEA1HKS010	Electrolytic 50V 1	1	
C419	ECEA1CKS100	Electrolytic 16V 10	1	
C420	ECEA1HKS010	Electrolytic 50V 1	1	
C421	ECEA1CKS100	Electrolytic 16V 10	1	
		Coil		
L401	ELEY102KA	1mH	1	
		Switch		
SW401	VSSW0025	ST/MONO Selection SW	1	
		Miscellaneous		
	VJJW0007	Jack	2	
CN401	VEKW0706	3P Connector Ass'y	1	
CN402	VEKW0720	3P Connector Ass'y	1	
CN001	VEKW0707	4P Connector Ass'y	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEPW0260	POWER ZOOM SW C.B.A.		
		Transistors		
Q801-804	2SD601(Q,R)	Chip	4	
		Resistors		
R801	ERJ6GJYJ682M	Chip 6.8K	1	
R802	ERJ6GJYJ560M	Chip 56	1	
R803,804	ERJ6GJYJ103M	Chip 10K	2	
R805,806	ERJ6GJYJ822M	Chip 8.2K	2	
R807	ERJ6GJYJ821M	Chip 820	1	
		Capacitor		
C801	ECEA1ASS221	Electrolytic 10V 220	1	
		Short Plugs		
P801	VJPW0009	9P	1	
P802	VJPW0002	2P	1	
	VEPW0264	KEY BOARD C.B.A.		
		Diodes		
D7201-7213	MA151A	Chip	13	
		Resistors		
R7201-7206	ERJ8GJY0R00	Chip 0	6	
		Miscellaneous		
CN011	VJBW0338	F.P.C. (F)	1	
	VNZW0142	Flexible Protection Sheet	1	
	VEPW0278	VCR/CAMERA SW C.B.A.		
		Switch		
SW702	VSSW0019		1	
		Miscellaneous		
CN705	VEKW0692-1	2P Connector Ass'y	1	
	VEPW0280	MIC JACK C.B.A.		
		Miscellaneous		
CN403	VEKW0705	3P Connector Ass'y	1	
	VJJW0006	Mic Jack	1	
	VNZW0126	Jack Barrier	1	
	VSCW0114	Jack Shield Case	1	

		Miscellaneous		
	S4165	Newvicon	1	
	ELY18A208J	DY Ass'y	1	
	VEKW0721-1	Camera Cable	1	
	VEKW0717	12P Socket Ass'y	1	
	VEKW0725	Power Transistor Ass'y	1	
	NR44	Cell	2	
CN005	VEKW0699	2P Connector Ass'y	1	
	VEKW0724	Bias Light Ass'y	1	
CN002	VEKW0713	9P Connector Ass'y	1	
CN006	VJBW0333	F.P.C. (A)	1	
CN007	VJBW0337	F.P.C. (E)	1	
	VEPW0265	MI. COM. SW C.B.A.		
		Miscellaneous		
CN004	VEKW0715-1	E Connector Ass'y	1	
	VEKW0363	Lug Terminal Ass'y	1	
	VEPW0266	E.V.F. C.B.A.		
		Transistors		
Q901	2SD662(R)		1	
Q902	2SB709A(R)	Chip	1	
Q903	2SD968(R)	Chip	1	
Q906-908	2SD601(Q,R)	Chip	3	
		Diodes		
D901	MA151K	Chip	1	
D902	MA162		1	
D903	S1B01-01		1	
		Resistors		
R901	ERJ8GJYJ223W	Chip 22K	1	
R902	ERJ6GJYJ332M	Chip 3.3K	1	
R903	ERJ8GJYJ681W	Chip 680	1	
R904	ERDS2TJ222	Resistor 1/4W 2.2K	1	
R905	ERDS2TJ101	Resistor 1/4W 100	1	
R906	ERJ8GJYJ102W	Chip 1K	1	
R907	ERDS2TJ103	Resistor 1/4W 10K	1	
R908	ERJ6GJYJ333M	Chip 33K	1	
R909	ERJ6GJYJ220M	Chip 22	1	
R910,911	ERJ8GJYJ105W	Chip 1M	2	
R912	ERJ8GJYJ152W	Chip 1.5K	1	
R916	ERJ6GJYJ152M	Chip 1.5K	1	
R922	ERJ6GJYJ102M	Chip 1K	1	
R923,924	ERJ6GJYJ823M	Chip 82K	2	
R925	ERJ6GJYJ102M	Chip 1K	1	
R926	ERJ6GJYJ562M	Chip 5.6K	1	
R927	ERJ8GJYJ102W	Chip 1K	1	
R928	ERDS2TJ273	Resistor 1/4W 27K	1	
R929,930	ERD25VJ225	Resistor 1/4W 2.2M	2	
R931	ERD25VJ185	Resistor 1/4W 1.8M	1	
		Variable Resistors		
VR901	EVML4GA00B13	1KB	1	
VR902	EVM3AGA00B55	500KB	1	
VR903	EVM7AGA00B26	2MB	1	

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